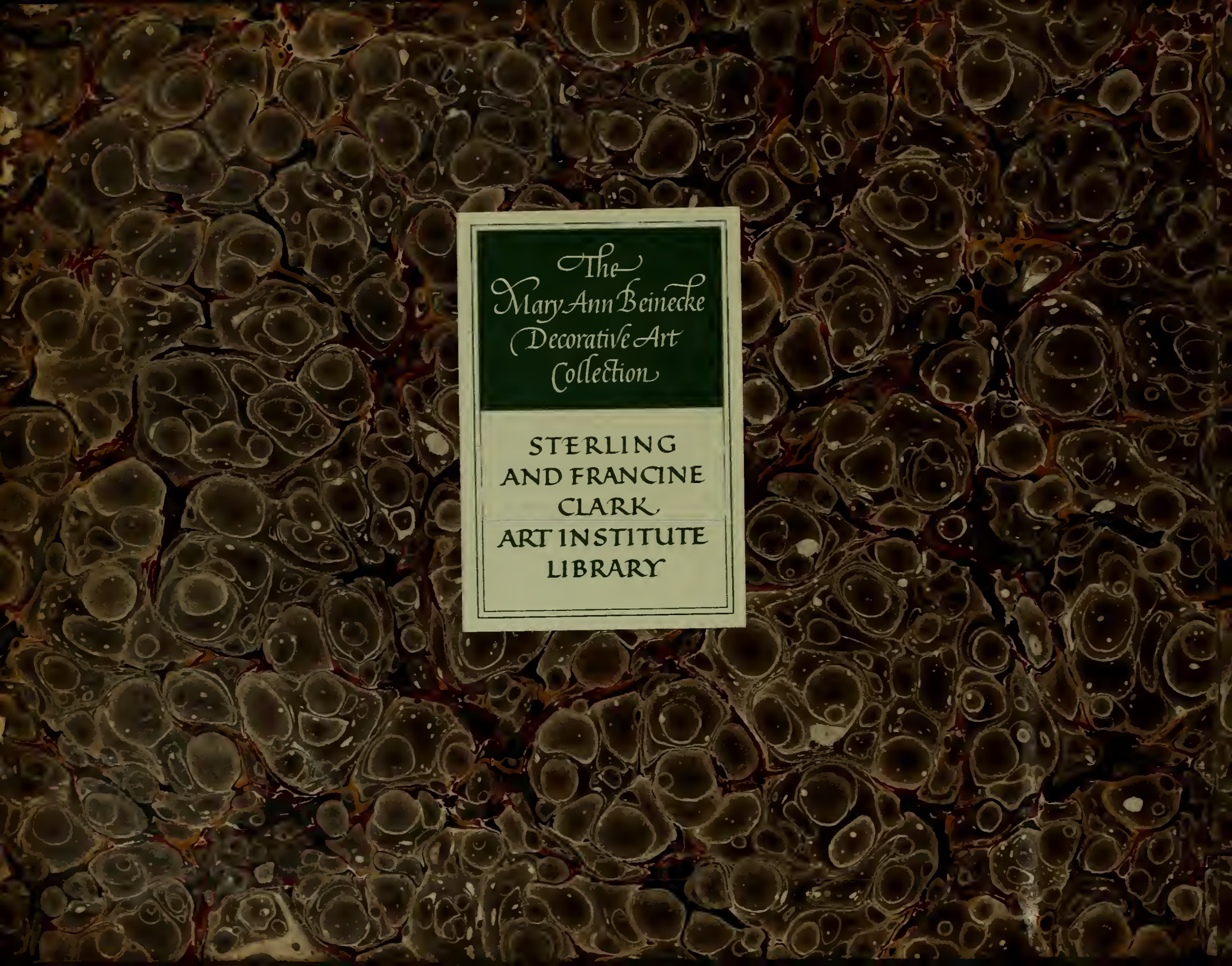
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Calculations, and Tables, connected with the Art of Weaving.—

Linen Yarn.—

The yarn spun from flax, usually denominated linen Yarn is, by Act of Parliament to be reeled on a ten quarter or 90 inch rul, and tied up into cuts of 120 threads or rounds of the rul, and 48 of these cuts to make a spyndle.— The spyndle of yarn however, admits of other subdivisions than the preceding which with the quantity contained in each are exhibited in the following table.

2.5	=	1 Split				
50.	=	20	=	1 porter or hasp		
300.	=	120	=	6	=	1 Cut
600.	=	240	=	12	=	2 = 1 hasp
3600.	=	1440	=	72	=	12 = 6 = 1 Slip or hand
7200.	=	2880	=	144	=	24 = 12 = 2 = 1 hasp
14400.	=	5760	=	288	=	48 = 24 = 4 = 2 = 1 Spyndle

The grist or fineness of linen yarn is commonly estimated by the weight of a Spyndle hasp or hand, sometimes by the Number of hanks in the avoirdupois pound, in some places in Scotland by the number of hanks in the Troy pound, and sometimes its grist is expressed by the number of hands in the avoirdupois pound, as for hand yarn six hand yarn &c

When yarn is gristed by the number of hanks in the pound avoirdupois it may be reduced to the weight of the spyndle by the following proportion, viz:— As the hanks in one ℔: the hanks in one spyndle (24) :: the ounces in one pound (16) : to the ounces in one Spyndle But 24 and 16 which are the mean terms of the proportion are both constant quantities their product therefore which is 384 divided by the hanks in the pound gives the weight of a spyndle or divided by the weight of a spyndle gives the hanks in a pound—

Ex. 1.— What is the weight of a spyndle of yarn of which there are 46 hanks in the pound?

$$384 \div 46 = 8 \text{ oz } 5\tfrac{13}{23} \text{ drs}$$

Ex 2.— What is the wt weight of a spyndle of yarn 6 hand?

In 6 hands there are 36 hanks. therefore $384 \div 36 = 10\tfrac{2}{3}$ ozs

| | | |

Cotton Yarn.—

There is no Act of Legislature which fixes the quantity of yarn in a spyndle of Cotton. but the following standard has been universally adopted by the Cotton Spinners in England, Scotland and Ireland.— The rule is 54 inches round 80 threads or rounds of which made a skein, ley or rap: 7 skeins make a number or hank, generally contracted No.; and 18 of these Nos. make one spyndle.— Cotton yarn however is commonly sold by the pound weight avoirdupois; and this takes place, whether the yarn be reeled or in cops: the number of Hanks or Nos. in a pound indicating its fineness.—
The length of the several subdivisions of a spyndle of Cotton yarn will be found by the following table

1.5 yards	=	1 thread or round of the cotton reel			
120. —"—	=	80	=	1 skein or ley	
840 —"—	=	560	=	7	= 1 No. or hank
15120 —"—	=	10080	=	126	= 18 = 1 Spyndle..

By comparing the lengths of the spyndles of cotton and linen together, it will appear that the former exceeds the latter by 720 yards. which in the calculation of warps makes a difference of 14 portes and 8 splits.— This difference added to 288. the portes in a spyndle of linen gives 302 portes and 8 splits for the spyndle of Cotton yarn which is an advantage of 5 per cent for 20 : 21 :: 288 : 302.4.—
The weight of a spyndle of Cotton yarn may be found from its Nos. and the contrary by a process similar to that given under linen yarn. Thus the proportion will be as the weight of a Spyndle : 16 :: 18 to the Nos in a pound. that 16 and 18 are constant quantities, and also. the mean terms of the proportion. their product. therefore which is 288 divided by either extreme will give the other.
Ex 1. What is the weight of a Spyndle of No 86 ? 288 ÷ 86 = 3 oz 5½ drs nearly
Ex 2. If a spyndle of Cotton yarn weigh 2½ oz what is its No ? 288.0 ÷ 2.5 = 115.5 Nos.
Multiply the Nos of the yarn by the number of pounds in the bundle and divide by 18
Ex 3. How many spyndles are in a 5 lb bundle of No 72 ? 72 × 5 ÷ 18 = 20 Spyndles.—

Transcribed from Murphy's Art of Weaving - Incorrect.

Table 2,

No.	weight of a Spindle lb.	oz.	No.	weight of a Spindle oz.	drs.	No.	weight of a Spindle oz.	drs.	No.	weight of a Spindle oz.	drs.
4	72	0.	46	6	4.2	112	2	9.1	178	1	9.8
4½	64	0.	48	6	0.	114	2	8.4	180	1	9.6
5	57	9.6	50	5	12.1	116	2	7.7	182	1	9.3
5½	52	5.8	52	5	8.6	118	2	7.	184	1	9.
6	48	0.	54	5	5.3	120	2	6.4	186	1	8.7
6½	44	4.9	56	5	2.3	122	2	5.7	188	1	8.5
7	41	2.3	58	4	15.4	124	2	5.1	190	1	8.2
7½	38	6.4	60	4	12.8	126	2	4.5	192	1	8.
8	36	0.	62	4	10.3	128	2	4.	194	1	7.7
9	32	0.	64	4	8.	130	2	3.	196	1	7.5
10	28	12.8	66	4	5.8	132	2	2.9	198	1	7.3
11	26	3.	68	4	3.6	134	2	2.3	200	1	7.0
12	24	0.	70	4	1.8	136	2	1.8	202	1	6.7
13	22	2.4	72	4	0.	138	2	1.3	204	1	6.5
14	20	9.1	74	3	14.2	140	2	0.9	206	1	6.3
15	19	3.2	76	3	12.6	142	2	0.4	208	1	6.1
16	18	0.	78	3	11.	144	2	0.	210	1	5.9
17	16	15.	80	3	9.6	146	1	15.5	212	1	5.7
18	16	0.	82	3	8.2	148	1	15.1	214	1	5.6
19	15	2.5	84	3	6.8	150	1	14.7	216	1	5.3
20	14	6.4	86	3	5.5	152	1	14.3	218	1	5.1
22	13	11.4	88	3	4.3	154	1	13.9	220	1	4.9
24	12	0.	90	3	3.2	156	1	13.5	222	1	4.7
26	11	1.2	92	3	2.1	158	1	13.1	224	1	4.3
28	10	4.5	94	3	1.	160	1	12.8	226	1	4.1
30	9	9.6	96	3	0.	162	1	12.4	228	1	3.8
32	9	0.	98	2	15.	164	1	12.1	230	1	3.6
34	8	7.5	100	2	14.	166	1	11.7	232	1	3.4
36	8	0.	102	2	13.1	168	1	11.4	234	1	3.1
38	7	9.2	104	2	12.2	170	1	11.	236	1	2.8
40	7	3.2	106	2	11.4	172	1	10.8	238	1	2.6
42	6	13.7	108	2	10.6	174	1	10.4	240	1	2.4
44	6	8.7	110	2	9.9	176	1	10.1	242	1	2.9

4	72.000	44	6.545	84		124		164		204		244		284			
5	57.600	45		85		125		165		205		245		285			
6	48.000	46	6.261	86		126		166		206		246		286			
7	41.143	47		87		127		167		207		247		287			
8	36.000	48	6.000	88		128		168		208		248		288			
9	32.000	49		89		129		169		209		249		289			
10	28.800	50	5.760	90		130		170		210		250		290			
11	26.182	51		91		131		171		211		251		291			
12	24.000	52	5.538	92		132		172		212		252		292			
13	22.154	53		93		133		173		213		253		293			
14	20.571	54	5.333	94		134		174		214		254		294			
15	19.200	55		95		135		175		215		255		295			
16	18.000	56	5.143	96		136		176		216		256		296			
17	16.941	57		97		137		177		217		257		297			
18	16.000	58	4.965	98		138		178		218		258		298			
19	15.158	59		99		139		179		219		259		299			
20	14.400	60	4.800	100		140		180		220		260		300			
21	13.714	61		101		141		181		221		261		301			
22	13.091	62	4.645	102		142		182		222		262		302			
23	12.522	63		103		143		183		223		263		303			
24	12.000	64	4.500	104		144		184		224		264		304			
25	11.520	65		105		145		185		225		265		305			
26	11.077	66	4.363	106		146		186		226		266		306			
27	10.667	67		107		147		187		227		267		307			
28	10.286	68	4.235	108		148		188		228		268		308			
29	9.931	69		109		149		189		229		269		309			
30	9.600	70	4.114	110		150		190		230		270		310			
31	9.290	71		111		151		191		231		271		311			
32	9.000	72	4.000	112		152		192		232		272		312			
33	8.727	73		113		153		193		233		273		313			
34	8.471	74	3.892	114		154		194		234		274		314			
35	8.229	75		115		155		195		235		275		315			
36	8.000	76	3.789	116		156		196		236		276		316			
37	7.784	77		117		157		197		237		277		317			
38	7.579	78	3.692	118		158		198		238		278		318			
39	7.385	79		119		159		199		239		279		319			
40	7.200	80	3.600	120		160		200		240		280		320			
41	7.025	81		121		161		201		241		281		321			
42	6.857	82	3.512	122		162		202		242		282		322			
43	6.698	83		123		163		203		243		283		323			

When the quantity of yarn is less or more than a Spyndle, to find its No. the proportion will be as the weight of the quantity is to the ounces in a pound so is the Number of hanks in the quantity to the No. of the yarn.

Ex. 4.— If 14 hanks weigh 2 oz 3 drs what is the fineness of the yarn?

35 : 256 :: 14 : 102.4 the No of the yarn.—

Ex. 5.— In a warp which weighs 5 lbs 10 oz there are 30 Spyndles of yarn, required the No of the yarn?

First as there are 90 ozs in the warp, and 540 hanks in 30 Spyndles we have

90 : 16 :: 540 : 96 the No of the yarn

To find the number of Spyndles in any quantity of Cops of a given fineness the proportion will be, as the ounces in a pound, is to the No. of the yarn, so is the ounces in the quantity to the number of Spyndles.

Ex. 6.— In 2 lbs 10 oz of cops No 72 how many spyndles?

16 : 72 :: 42 : 189 hanks

Here we have 189 hanks, which divided by 18 gives 10 Spyndles and 9 hanks.—

Cotton Warps—

It has been already shown, that the spyndle of Cotton produces 302.4 porters one ell long; consequently, the No. or hank will give 16 porters and 16 Splits or decimally 16.8. Hence to find the ~~porters~~ Spyndles when the ells and porters are given

Multiply the ells and porters together and divides by 302.4 for Spyndles and the remainder by 16.8 for hanks and 24 for Skeins

Ex 1.— How many spyndles will it require for a warp of 146 ells with 88 porters?

$146 \times 88 \div 302.4 = 42$ spy. 8 hks $5\frac{1}{3}$ skeins.

Ex. 2. How many spyndles will it take to make 100 ells of a web with 92 portes and 12 Splits?

12 Splits is $\frac{3}{5}$ of a porte — Or decimally thus: $\frac{92.6}{100}$

$$\frac{100}{92}$$
$$\frac{9200}{60 \text{ for 12 Splits}}$$

$$\frac{100 \times 3}{5} = 302.4 \overline{)9260.0} \ (30 \text{ sp. } 11 \text{ hds. } 15 \text{ ells.}$$

$$\begin{array}{r} 9072 \\ \hline 1880 \\ 1680 \\ \hline 200 \\ 168 \\ \hline 32 \\ 24 \\ \hline 8 \end{array}$$

$$16.8 \overline{)1880} \ (11$$

$$24 \overline{)32} \ (1\frac{8}{24}$$

The allowance that is usually made for waste in winding and warping linen yarn, should also be sufficient to uphold cotton warps, though calculated by the rules here laid down: for linen yarn is fully more liable to waste in the different stages of manufacture than cotton, not only in each operation, but in boiling and washing it shrinks considerably, which cotton is not subject to: — Besides, when the yarn is wound off the cops, which causes the loss that takes place in Reeling, the allowance for waste should not be so much as above stated However, as 5 per cent is commonly allowed for cotton warps as well as linen, they may be calculated by the rules here given, only instead of dividing by 12 for lines divide by 16 for Nos. although the allowance for waste will depend on the quality of the yarn —

When the portes and Spyndles are given to find the ells, multiply the number 302.4 by the spyndles and divide by the portes in the warp: —

Ex. 3. — Suppose 24 spyndles of warp and 63 portes, how many ells?

$$302.4 \times 24 \div 63 = 115.2 \text{ ells} —$$

To find the number of ells in any bundle of yarn, or quantity of cops, the weight being given without regarding the spyndles. —

Multiply the Nos of the yarn, the pounds in the quantity of yarn and the number 16.8 together for a dividend, and divide by the portes the result will be the ells in the quantity. —

Ex 4. — How many ells will a 5 lb bundle of No 84. or 5 lbs of cops produce, suppoing 62 portes?

$$\frac{16.8 \times 84 \times 5}{62} = 113\frac{25}{31} \text{ ells}$$

To find what weight of cops will make any web, without regard to the spyndles, the ells, portes, and Nos. of the yarn being given.—
Multiply the ells and portes together for a dividend, and the Nos of the yarn by 16.8 for a divisor: the quotient is the weight required.
Ex. 5.— What weight of cops No 120, will make 99 ells of web in which there are 93 portes?

$$\frac{93 \times 99}{16.8 \times 120} = 4\text{ lbs } 9\text{oz } 1\tfrac{3}{21}\text{ Drs}$$

If it were required to calculate the length of warps in yards of 36 inches, the product of the portes and yards is divided by 378 for spyndles: by 21 for Nos: or hands and by 3 for skeins For 36 : 45 :: 302.4 : 378
Ex 6.— Required the warp for 125 yards with 93 portes?

$$125 \times 93 \div 378 = 30.75397 \text{ Spyndles}$$

In calculating whips, multiply the ells by the number of nudles, and divide by 20 for the portes then procead as in the forgoing examples—
Ex 6— How many spyndles wile 800 ells require with 63 nudles?

$$\frac{800 \times 63}{20} = 2520 \quad \text{then} \quad \frac{2520.0}{302.4} = 8\tfrac{4}{5}\text{ Spyndles}$$

Linen Yarn—
The length of warps are usually measured by the English ell of 45 inches and as the linen reel is 90 inches in circumference, one thread or round of it will make a spittall one ell long— A cut, therfore, will produce 6 portes a heer 12, a hand 72 as hesp 1584. and a spyndle 288.— Hence, to find the quantity of warp requisite for any web we have the following rule
Multiply the ells by the portes in the web and divide by 288 for spyndles 72 for hands, 12 for heers or 6 for cuts
Ex.— How many spyndles will it require to make a web 100 ells long with 62 portes of warp?

$$\frac{100 \times 62}{288} = 21\text{ Sp, 2 hds, } 1\tfrac{3}{4}\text{ Cuts} - \text{ Or if there are 6 heers, or one hand to be wound on each bobbin, to find the number of bobbins or runners for the warp divide the product of the portes and ells by 72 and the remainder by 12 for heers—}$$

Ex – How much warp will it require to make 144 ells of a 1200 seven-eighth Clear Lawn?

First – $\frac{1200 \times 7}{8} = 1050$ split or $52\frac{1}{2}$ porters, to which may be added 3 porters more to uphold the breadth in bleaching &c. Then

$\frac{144 \times 55\frac{1}{2}}{72} = 111$ hks on bobbins –

To these must be added the allowance for waste in reeling winding and warping, which for linen yarn is commonly 5 per cent –

When the porters and spyndles are given to find the ells, multiply the number 288 by the spyndles, and divide by the porters in the warp

Ex – If 20 spyndles of yarn answer a 1200 linen, how many ells will it make allowing $62\frac{1}{2}$ porters $\frac{288 \times 20}{62.5} = 92\frac{4}{25}$ ells.

But the fraction and 4 ells more may be deducted for waste as mentioned above, which will leave 88 ells nett for the length of the web

If it were required to calculate the warp by the yard of 36 inches, instead of the ell 45 we must substitute the number 360 for 288 for 36 : 45 :: 288 : 360.

Calculation of Weft –

The quantity of warp in any web or piece of cloth can be found by the rules already given, to any degree of accuracy; but the same accuracy in the calculation of weft is not so easily obtained; for this process depends in general, on the number of shots on the glass, which, as already observed, is contained 5.4 times in an inch for ends or 37 inches, and therefore, a fractional part of a shot, which cannot be well ascertained, may amount to a considerable error in the length of a web. Thus, for instance, if there were 36 spyndles of warp in a web woven in a 1200 reed and counting 12 shots on the glass, it would be presumed that there were 36 spyndles of weft also – If 13 shots, that there were a twelfth more or 39 spyndles and if only 11, a twelfth less or 33; being 3 spyndles of difference for each shot. – Hence it is evident, that when a larger measure can be easily applied, the risk of error would be thereby diminished, so that an inch for example, would reduce such errors in the ratio of 5.4 to 1.

When the number of shots on the glass, and the breadth of the cloth are given, the quantity of weft or ounyard will be found by the following rule :-
Multiply the shots on the glass, the inches in the breadth, and the number 5.4 together and divide by the number of yards in a skein, hank or spyndle
Or, when the number of shots in an inch can be ascertained, multiply the shots in an inch, by the inches in the breadth, and divide as above
Example - Suppose a piece of cloth 60 inches broad, with 18 shots on the glass to find the Nos. and skeins in a yard, allowing 5 per cent off the cotton mill for waste - Since there are 120 yds in a skein and 840 in a No. or hank, which after deducting 5 per cent, will leave 114 for the former and 798 for the latter.
Then $\frac{5.4 \times 60 \times 18}{114} = 51.15$ skeins or thus $\frac{5.4 \times 60 \times 18}{798} = 7$ Nos 3 Hk

Warping

When the quantity of warp in any web is ascertained, it is given to the warper, with a ticket expressing the number of ells, spyndles, and portes in the web - If the web be stripped, either with different, or colors of yarn, one suit of the pattern must likewise be drawn on the ticket for the warpers and weavers instruction - In the examples of the calculation of webs from cotton yarn, it was found that 30 spyndles and about 12 Nos. were requisite for a web in which there were 100 ells and 92 portes 12 splits - But, as this calculation was made to the full extent of the cotton standard, the usual allowance of 1 spyndle to 20 must be made for waste, which in the present instance may be taken at 1 spyndle and 12 Nos. - This added to 30 spyndles 12 Nos, gives 32 1/3 spyndles for the nett ~~weight~~ warp of the web - If six number of yarn be wound on the bobbin, as is generally the case, the number of bobbins, or mounces in this example will be 97. - When these are placed in the band, and the ends taken through the heck, they are all knotted together and placed on the upper pin of the mill - The haze is then formed by raising alternately the two parts or frames of the Heck and secured on the upper brass pins; after which the yarn is divided into small parcels, called half gangs or half bouts which are kept separate by the by the rollers on the frame of the heck, during the process of warping - The number of threads in the half gangs are usually regulated by the suit of cut, though this is often left to the warpers discretion - The mill is then turned round, and as the cord by which the heck is suspended unwinds itself from the upper spindle of the mill, the heck

gradually ~~round~~ ~~itself~~ descends, and warps the yarn round the mill in a spiral direction, until the length of the web be determined — In the present example, if the mill were five ells round 20 rounds or turns of the mill would give the length; but if the mill were only four ells, 25 rounds would be requisite — The under lease fork is then placed a little beyond the 100 ells, to make an allowance for the thrum and reed; and the half gangs are turned round the pins of the fork, and crossed alternately after the manner of a lease — The mill is then turned the contrary way, until the hand be again opposite the upper fork when a lease is made by the hand, and placed in the fork pins as before. Once down the mill and up again is called a bout or midgang, and as there are now two threads on the mill for each runner, the number of splits in one bout will always be equal to the number of runners. —

Before the warper proceeds further he must calculate how many bouts are necessary to produce the whole warp of the web — This is done by reducing the portes in the web to splits and dividing by the number of runners, and the quotient will give the answer — thus

Portes	splits
92	12
	20
97 / 1852	19 bouts
	97
	882
	873
	9 splits over.

That is 19 bouts and 9 splits over, which 9 splits must be made up either by running another bout with 9 bobbins, or adding another bobbin for the last nine bouts. —

As the circumference of the five ell mill is now commonly divided by the sporles into 20 equal parts, and the four ell mill into 16 parts, each of these parts will be equal to $\frac{1}{4}$th of the English ell of 45 inches — At whatever distance, therefore the rules, or cutting marks are to be placed, the ells and parts of an ell between them may be counted round the mill and marked accordingly — But if the web is to be divided into pieces of any particular lengths as for squares &c, a netting divided into inches, and applied round the mill along the chain will give the length required. — When the whole of the warp is on the mill, the leases are secured by tying a piece of twine round the upper part of the warp, which are separated by the pins, and the web is taken off the mill, either by rolling it up in the form of a chain, or making it into a chain, by taking it over each hand alternately, in loops.

When the web is finished, the warper marks the number of pins on the ticket for the beamer instruction, which is found by doubling the number of pins in the lease and multiplying them by the number of gangs. —

In large factories where the warper is not restricted to any number of bobbins, it is customary to allow one runner for each porte of the web, which will always give 20 bouts.

In warping stripes or ginghams, when the stripes are not similar on each side the pattern must be <u>counted</u>; that is when the chain is twisted the second time, both at the head and foot, that part of the warp that would be outward in the usual way, must be turned towards the side at each bout. —

Beaming —

To find the number of the ravel or cross, which will spread out the warp of a web to the given breadth on the beam — ravels like reds are counted by the number of teeth or pins in 37 inches, between each of which a half gang is placed in beaming. — When therefore, the web is any other breadth than 37 ell, the number of half gangs multiplied by 16, and divided by the nails in the breadth will give the number of the ravel sought —

In the preceding example of warping, suppose 308 half gangs. Then as the web is $\frac{3}{4}$ $\frac{308 \times 16}{24} = 205.333$:

That is 205 pins or a two score & 5 ravel. But as the web is always laid a little broader on the beam than it is in the reed, the ravel must be somewhat coarser or counted off fewer pins; and the headings are sloped gradually by holding the ravel more or less oblique —

Reeds —

The reed is the scale by which, independent of its being employed in striking up the woof, the manufacturer determines the fineness of his cloth, being so constructed that a certain number of warp threads may always be contained in a given breadth of web. — For the principal manufactures of Scotland and Ireland, the scale of reeds is regulated by the number of splits contained in the Scotch ell of 37 inches. The splits in this span are divided into hundreds, the number of which, in any reed, indicates its sett, and each hundred is again divided into five parts called portes, which consequently contain 20 splits — Reeds made for Holland and Cambrics, which were till of late very common in Scotland, had scales peculiar to themselves, the hundreds or sett of the former being counted on 40 inches and of the latter on 34 which corresponded to the breadths of their respective fabrics — In England the reeds are different from any of the preceding — Those denominated the Manchester and Bolton reeds, take their designation from

the number of dents (splits) in 2½ inches, and are divided into hers (hanks) which contain sometimes 19 but more frequently 20 dents. The sett or fineness of the Stockport reeds is known by the number of ends or threads of warp in an inch; and in two reeds are equivalent to one dent, the fineness or sett of the reed is expressed by the number of dents in two inches. Thus a 40 reed has 20 dents in an inch; a 50. 25 dents. In Manchester they generally make use of the Stockport reeds for muslins only; and the Bolton, for quiltings, dimities, ginghams, muslins, corduroys &c. There are several kinds of goods, however, such as calicoes, cloths and handkerchiefs which are woven in pieces constructed on 36 inches and, indeed, each of these seems to be adapted to peculiar kinds of cloth as was formerly the case with respect to the Holland, cambrics, and lawns of Scotland. The fineness of any piece of cloth therefore, takes its denomination from the sett of reed in which it has been woven, without any regard to its breadth, or the quantity of warp it may contain; for when the cloth is intended to be broader or narrower than the standard, proportional parts must be added or subtracted, to give the requisite quantity of warp. Thus the standard for Scotch reeds is 37 inches, which is commonly divided into 16 parts called nails; and the breadth of the cloth is generally expressed by the number of nails or sixteenths which it fills of the reed.

This was uniformly the case with respect to all goods made of linen yarn, which were subjected to the inspection of a stamp master; but since the cotton manufacture has become so extensive, and every manufacturer must make his goods to suit the market for which they are destined, it is more common to calculate the breadth of webs by inches.

Hence, when the standard is divided into nails to find how much warp is requisite for any breadth of a given sett of reed, multiply the no. of splits in an ell or 37 inches by the nails in the breadth of the web and divide by 16.

Ex 1. How much warp is requisite for a 1300 web 18 nails broad?

$$\frac{1300 \times 18}{16} = 1462\tfrac{1}{2} \text{ splits} = 14 \text{ hundreds } 3 \text{ portions } + 2\tfrac{1}{2} \text{ splits}$$

Ex 2. How many splits of a 1200 reed will be filled by a web 17 nails broad?

$$\frac{1100 \times 17}{16} = 1169 \text{ splits nearly} = \text{or } 11 \text{ hundred } 3 \text{ portions and } 9 \text{ splits}$$

When the breadth is given in inches, to find the number of splits, multiply the warp in an ell by the number of inches broad and divide by 37.

Leaaming, Sleying or Setting

These terms are severally employed to denote the proportioning of the grists or finenesses of warps to the different setts of reeds, so as to preserve a uniformity of fabric, in the same species of cloth. In order to explain what is meant by the word fabric; let us suppose that a piece of cloth is woven in any sett of reed, as for instance a 1200 on 36 inches, and that the diameters of the warp threads and the small spaces between them are of exactly the same size them; if we have another piece of cloth of the same texture, woven for example in our 1800 reed, the diameter of the warp threads being also equal to the intervening spaces, then these two sizes of cloth are said to be of the same fabric, although the one is a third finer than the other; so that when the diameters of the threads are greater than the spaces the fabric is proportionably stouter, and the rooms when they are smaller. Now the method of determining the several grists of yarn that will preserve the uniformity of fabric through the different setts of, and depend on the following analogy —

As the square of any given reed,
Is to the grist of yarn that suits that reed,
So is the square of any other sett of reed
To its respective grist for the same fabric. —

The reason of this rule will evidently appear, by considering the thread of warp, when stretched in the loom as so many cylinders of equal length or altitude, and the reed as the scale which measures the space in which a given number of these threads are contained; therefore, the solidities of the threads in one sett of reed, will be to the solidities of those in any other sett of reed, as their bases; or which is the same thing, as the squares of their diameters, by pp. 11. & 12 of Euclid. — But the weights of the cylinders or threads supposing them of the same density will be as their solidities; and a determinate number of splits or dents in any reed; or rather the intervals between them, may be substituted for the diameters of the warp threads which pass through them: Therefore

by the last analogy, it will be, as the square of the number of splits in any given rud is to the known weight or grist of yarn, so is the square of any other number of splits occupying the same space, to the weight of or grist of yarn that will produce cloth of the same fabric, which is the rule given above. The threads of warp are here supposed to be of the same density, which may in some instances appear not to be the case, owing to the difference of twist they may have received in spinning; but when the warps are tightly stretched in the loom, and all their fibres compactly laid by the weavers dressing, their density, though perhaps not mathematically the same, will be sufficiently near to answer every practical purpose of the manufacturer

Ex. 1. If No 72 make a 1200 jaconet, what will suit a 1600?

Here 144 is the square of 12 and 256 the square of 16.

Then 144 : 72 :: 256 : 128 No.

So that No 128 woven in a 1600 rud, will make the same fabric as No 72 in a 1200.

When the rud contains odd porters, which is frequently the case when the fabrics are coarse, the hundreds must be reduced to porters and squared as above

Ex. 2. Suppose No 50 for a 1200 publicate, what will answer a 900 and 3 porters

hund.	hund.
say 12	4. 3
5	5
60	48
60	48
3600	384
	192
	2304

3600 : 50 :: 2304

50

3600 / 115200 (32 No

108

72

72

When the grist of yarn is given to find the rud, invert the terms of the proportion and extract the square root of the fourth term for the answer

Ex 3. If No 70 make a 1600 cotton cambric, what suit with No 93 made

70 : 256 :: 93 : 340 $\sqrt{340} = 18.44$ nearly.

When linen yarn is gristed by the number hanks in the pound; the process will be the very same as the preceding, only substituting the hanks for hds. but when it is gristed by the weight of a spyndle a hank, the proportion will be inverse, as the numbers expressing the grist of the yarn decrease, while those denoting the sets of reed increase

Ex. 4 – If yarn which weighs 8 oz per hank make a 600 lawn; what grist of yarn will make a 1200 of the same fabric?

36 : 8 :: 144 : 2 oz –

Ex. 5 – If 4 oz per hank, would do a 600 yarn what will answer a 800?

– Here the ounces must be reduced to eighths, which are 33 –

36 : 33 :: 64 : 18 2/4 eighths nearly or 2 oz 5 drs.

Ex. 6 – Suppose, as before, 8 oz to a 600 lawn, what reed will 4 oz require to make the same fabric?

8 : 36 :: 4 : 72 Then $\sqrt{72} = 8.48$

These examples, though sufficiently plain to illustrate the general principle of cauming, may still, in practice, be considered as intricate and perplexing to those who are unacquainted with the management of square numbers –

Tweeling.

Could any advantage have been proposed, either to the manufacturer or operative handsman, by entering into a detail of the processes of weaving plain cloth, this branch of the art, both on account of its simplicity and extensive use, is the first in order which ought to have claimed our attention. Since however, it is not the manual process of weaving, but the texture and ornamental decorations of cloth produced in the loom which are to be investigated, it is unnecessary to add any further notice of plain texture in this place than as it stands in relation to other branches of weaving.—

In the texture of plain cloth, each thread of weft passes under and over a thread of warp, alternately; and two leaves or heddles, only, are requisite to produce this effect.—Tweeling, however, takes a greater range with respect to the intervals at which the threads of warp and weft are interwoven; and these intervals vary in proportion to the number of leaves employed, and the order in which they are raised or sunk. Just as plain texture or tweeling is the most extensive in its application to every branch of the cloth manufacture: it not only serves as a ground on which other decorations are wrought but it forms, purely on its own principles, some of the most beautiful patterns which can be produced in the art of weaving.— The number of twills, which may be wrought by varying the succession of draught or plan of cording, or order of treading, is very extensive: but they may for the sake of distinction be treated of under the following heads, namely, biassed or regular twills, broken or satin twills and fancy twills.—

Regular Biassed Twills.

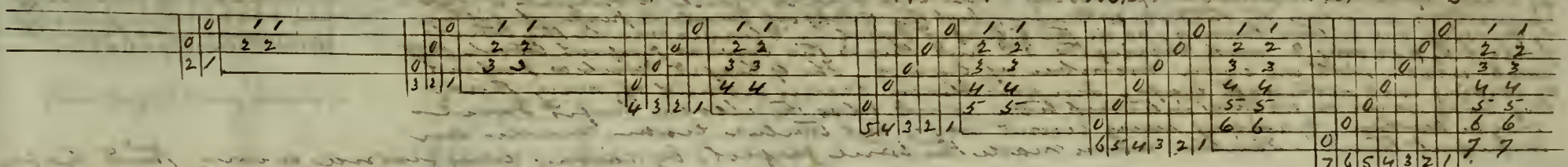
In the biassed twills, the small stripes of plushing, formed by the intervals at which the warp and weft are interwoven, run obliquely across the cloth, which is effected by drawing the warp threads in regular succession over the leaves, and working over the treadles in the same order one leaf only being raised or sunk by the same treadle, although it is understood in this as well as the other branches of weaving, that the smallest number of leaves are raised, and the greatest sunk, when practicable.—

The first variation or change from plain cloth is the three leaved twill, in which every third leaf or thread is raised in succession, the weft passing over the other two.—This is sometimes termed the blanket twill, and sometimes the fustian twill, from being frequently employed in weaving these fabrics.—

The four leaved twill flushes the weft over three threads of warp, and is only interwoven at the fourth.—The five leaved twill flushes the weft over four threads of warp and sinks it under the fifth, and so of any higher number of leaves; for here the leaves only extend the range of flushing, by which the resistance that the warp naturally opposes to the weft is proportionately diminished.— For this reason twills frequently take their designation from the number of leaves employed in weaving them; though sometimes, from the name of particular kinds of cloth to which they are most commonly adapted.—

The following plans and their corresponding figures on dassie paper will sufficiently explain this species of weaving, as the numbers of the leaves in the mounting rise progressively from that of plain texture to the six leaved twill, and as the order of drawing in the warp are uniformly the same; whatever number of leaves may be employed, the principle may be extended to any higher mounting.—

No.1 Dis.1. No.2 Dis.2 No.3 Dis.3 No.4 Dis.4 No.5 Dis.5 No.6 Dis.6



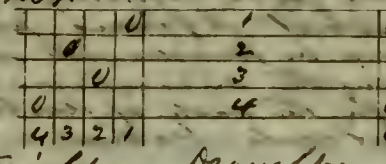
Broken or Satin Twills.

In regular twills, the flushings has the appearance of a series of small diagonals or oblique stripes on the cloth; but when the succession of treading is changed so as to raise the leaves at intervals of one, two or more from each other, the twill is said to be broken; and the flushing no longer runs obliquely, but is variously diversified according to the order of treading.—

It is to be observed of satin twills, that some are perfect in respect to the intervals at which the leaves can be raised, and others are imperfect. When the leaves can be raised regularly, at intervals of one, two or more from each other, the twill is said to be perfect; but imperfect when the number of leaves does not admit of the arrangement. The lowest twill that can be broken is that of four leaves which is usually called the satin twill.

Four leaved or Satinet Twill.—

No 7.



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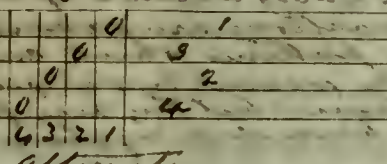
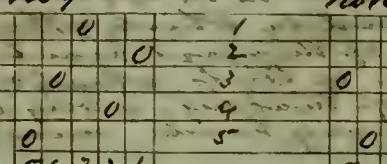


Straight.— Draught alternate.—

Five leaved Satin Twills.—

No 9.



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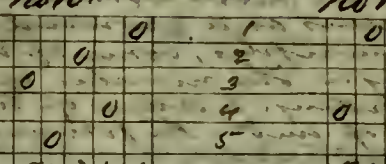

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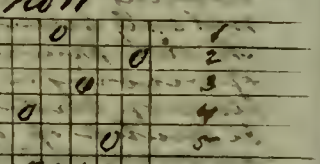
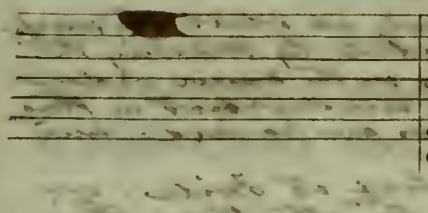


Six. Seven. Eight and Nine leaved Twills.—

No 12.



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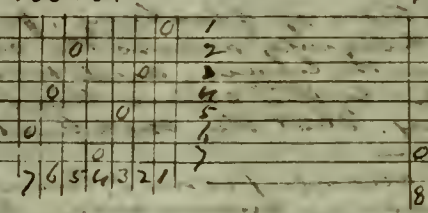

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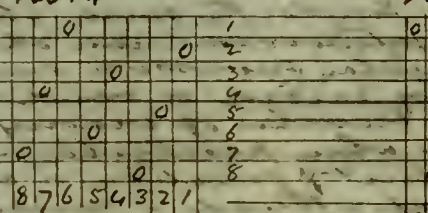

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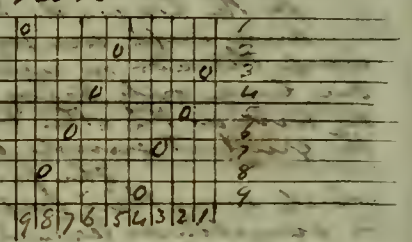
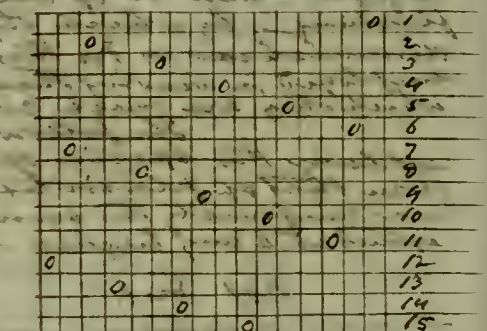


In these plans the treadles are arranged in their natural or progressive order, to point out more distinctly, by the raising marks, the intervals at which the leaves are raised.— In the satinet straight draught for instance, the raising cord for the back treadle is on the back leaf 1. the leaf 2 is passed and another raising mark is placed on the leaf 3.— The leaves 4 & 1 are next passed and the third raising mark is placed on the leaf 2.— The leaf 3 is now passed and the fourth raising mark is placed on the fourth leaf.— It now appears that in course of tying up these treadles, there must be two leaves passed over between casting the treadles 2 & 3 and that none can be found between 4 & 1.; Consequently in this mounting the leaves cannot be raised at equal intervals; and therefore it is one of the imperfect twills among the five leaved Twills No. will be found to raise each alternate leaf throughout the whole pattern; and that two, and pass two and raise the third without interruption; consequently the five leaved Twill is imperfect by each of these methods of casting.— The six leaved Twill is subject to imperfections similar to that of 4 leaves; but the 7 leaved Twill is perfect, either by passing one or two leaves; as in the 6 leaved Twill.— 8 leaves make the twill perfect by passing 2, and raising the 3rd and this is the lowest perfect twill that can be woven with an even number of leaves.— The 9 leaved Twill is perfect by raising each alternate leaf.— Ten and eleven leaves admit of every third leaf being raised without interruption; and also the eleven leaved Twill may be broken, by raising every second leaf; but twelve leaves render an imperfect twill.— Thirteen leaves make the twill perfect, by raising every second or every third leaf—

Sixteen leaved Satin Twill.—

No 16.

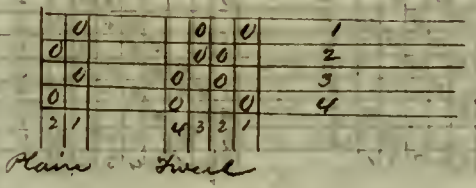


fourteen purpet by raising every third. – In the fifteen leaved twill either one or three leaves may be passed, and in that of sixteen which is frequently employed in weaving some kinds of fine silks either two or four may be passed and the third or fifth raised. –
The three leaved twill is extensively employed in weaving stout fabrics, such as blankets, fustian, Cobourgs &c – The four leaved biassed twill is usually appropriated to the imitation harness wood, diaper, and several species of silks. – The four leaved broken twill, besides the purpose already mentioned, is much used in the coarser kinds of diaper, called "Domixed." The five leaved satin twill, of which No – is usually selected, is applied to diaper and the coarser sorts of damask; and the eight leaved broken twill is appropriated to the finer kinds of damask and Canton crapes. – It may further be remarked, that all twill mountings of an odd number of leaves, except that of three, which does not admit of being broken, will produce perfect twills, it being among the even numbers that imperfections are found. –

Fancy Twills. –

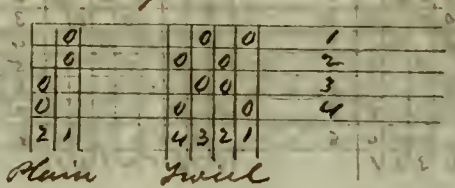
In all the preceding twills, whether regular or broken, only one leaf is raised by each treadle all the others being sunk; by which means the greater part of the weft is thrown to one side of the cloth, and of the warp to the other. – Of what are here denominated fancy twills any number of leaves may be raised at pleasure, and a variety of plans being interspersed with plain texture, produced, in proportion to the extent of the mounting, and the order in which the leaves are raised. – The lowest of these twills that occurs is that of four leaves, or double fine – This mounting admits of no more than three varieties in twilling, namely the double fine or satin twill, in which two leaves are raised and two sunk by each treadle, the regular or biassed twill and the broken or entwined twill – As this mounting, however is very much employed, as well for plain as for twilled fabrics it may be of use to subjoin plans of the cordings which produce these textures, both when the draught is straight over the leaves and when it is alternate. –

No 18.



Plain Twill

No 19.



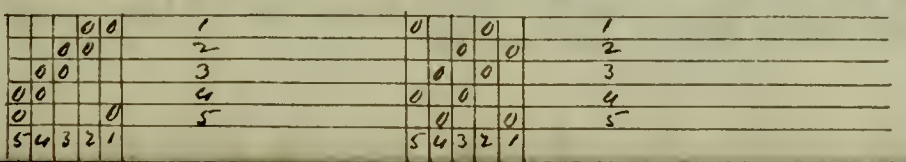
Plain Twill

In No 18 the warp is drawn in regular succession over the leaves and the cording of the twill is adapted to practice, as plain fabrics are generally woven with four leaves instead of two, to prevent the heddles, being too much crowded together, the warp is commonly drawn on alternate leaves as No 19. The following examples will show how an endless variety of patterns may be produced in fancy twilling, the number of leaves is increased and the ~~number of leaves raised~~ plans of cording varied. – As the eight and five leaf twills are in frequent use, some of their principle varieties are subjoined – 21
To show the effect of any of these patterns on design paper it is only necessary to fill as corresponding number of squares equal to the number of squares in the cording plans, and by repeating the plans on each side, both the ruin of the pattern and the joining will be exhibited this will be obvious, by comparing a few examples on design paper with their respective cordings
It may be further observed that varieties may be produced as long as the raising marks are fewer in number on the treadles, but when they exceed the sinking ones, the pattern resulting has every chance to be the same as some of the preceding ones, thrown to the opposite side of the cloth. –

No 20

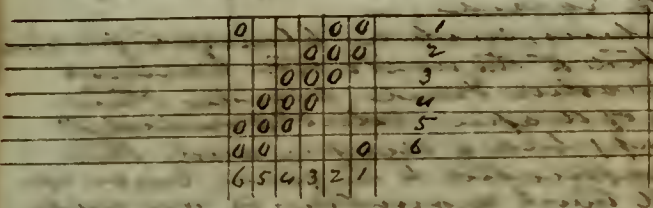
No 21.

Five leaved Fancy Twills –



Six leafed Fancy Jewels

No 22.



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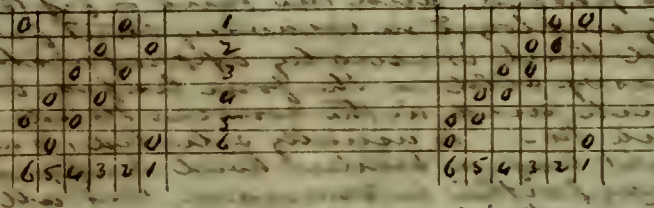

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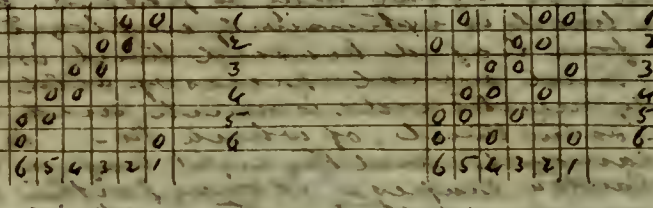

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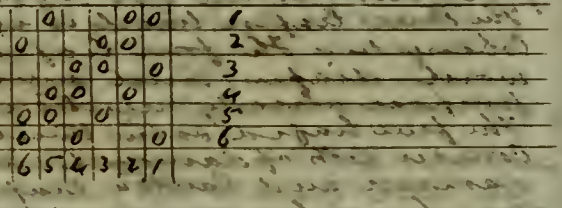
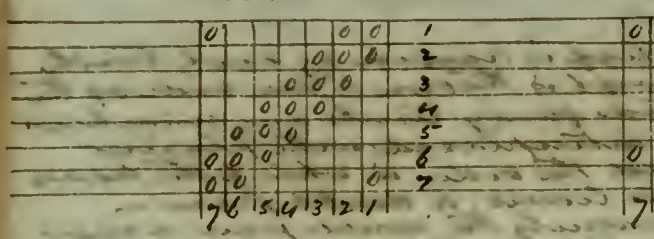


Seven leafed Fancy Jewels

No 26



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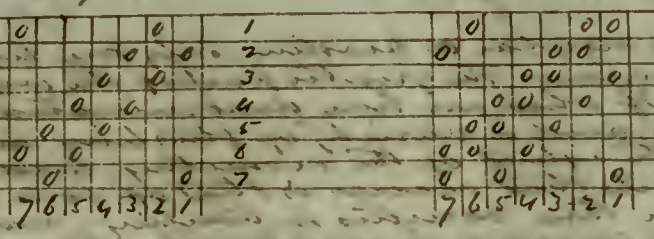

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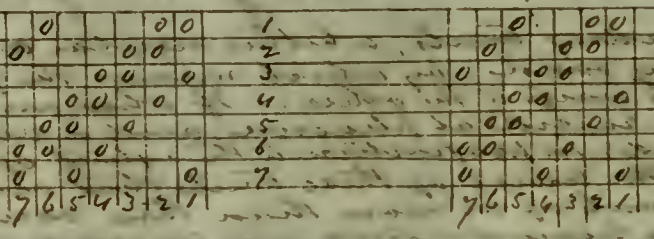

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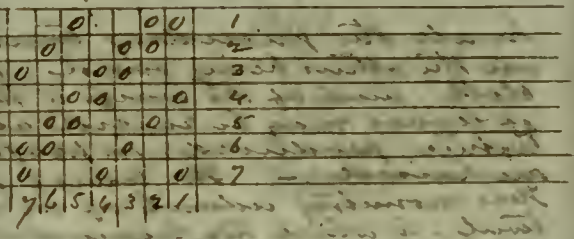
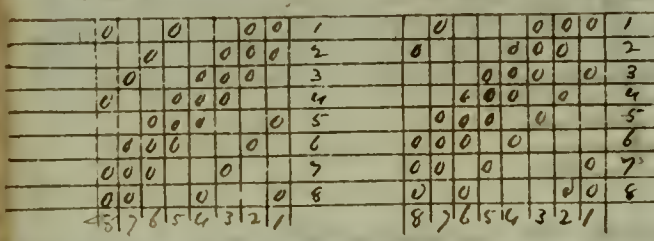


Eight leafed Fancy Jewels

No 30



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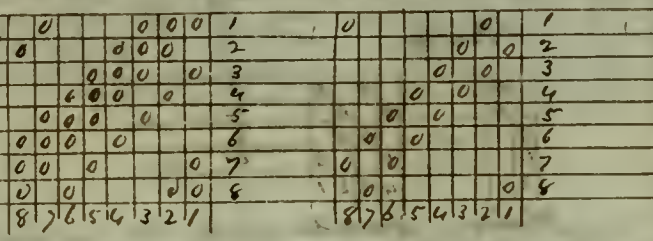
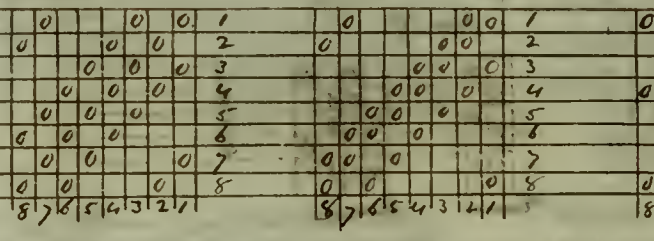


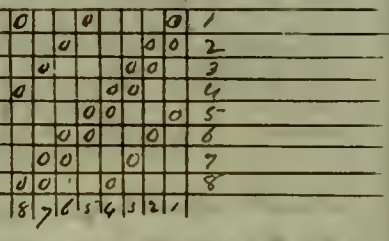
No 32

No 33



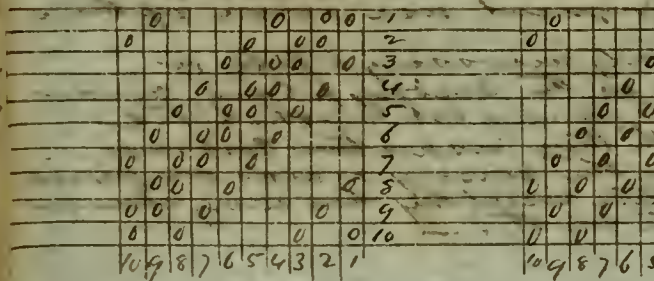
No 34

No 35



Ten leafed Fancy Jewels

No 36



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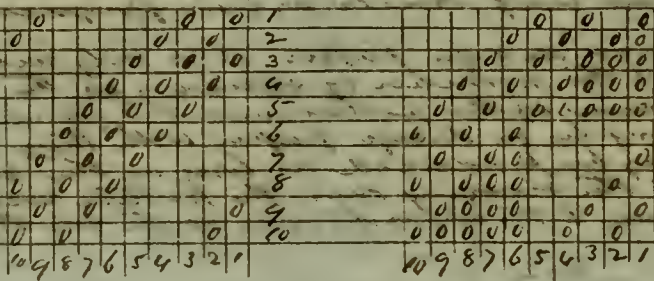

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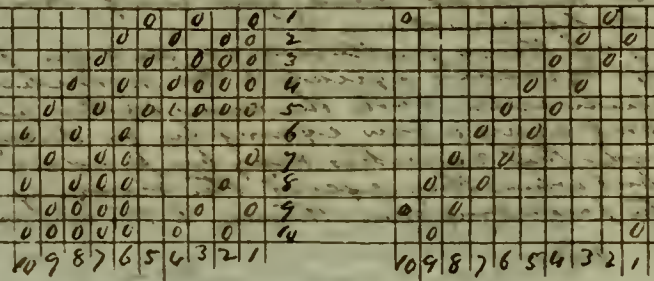
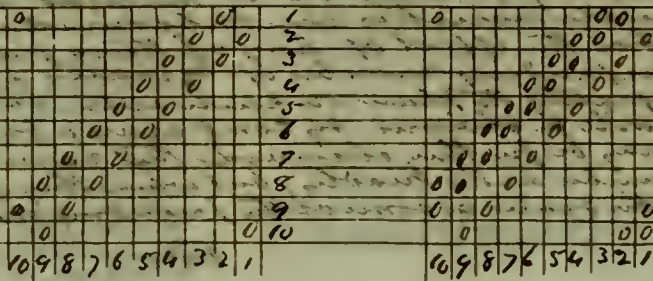


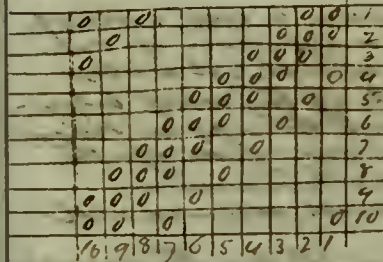
No 39



No 40

Ten Leafed Fancy Twill -

No 41



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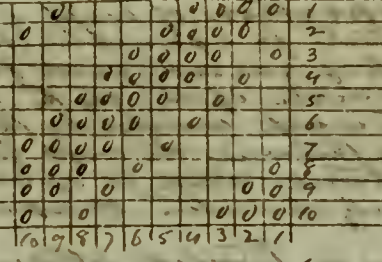
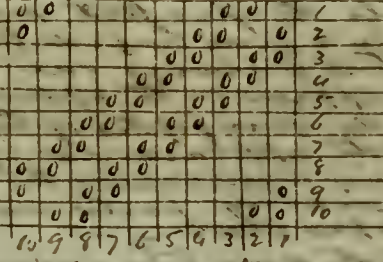


No 43



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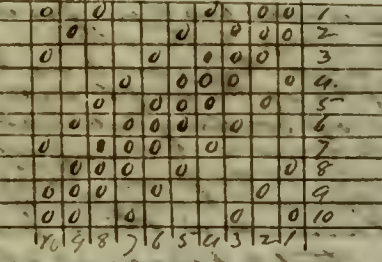
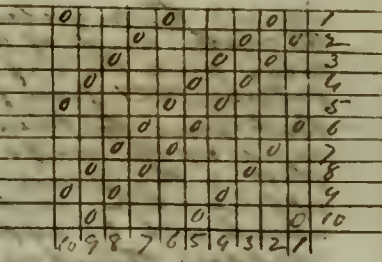
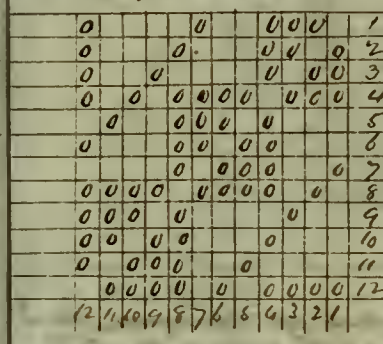


No 45

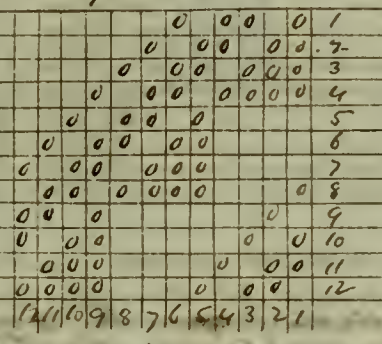


Twelve Leafed Fancy Twills

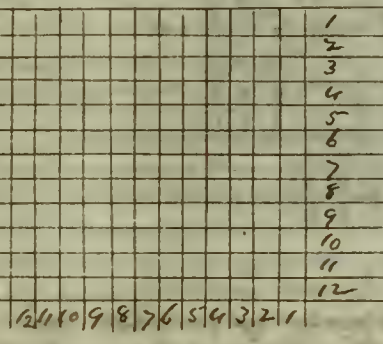
No 46.



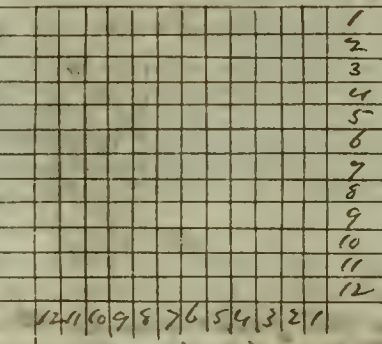
No 47.



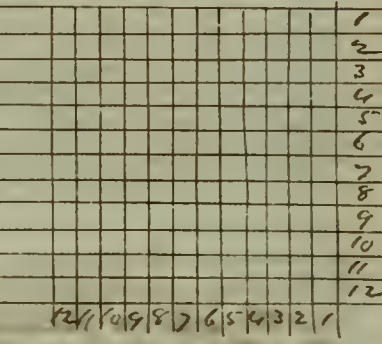
No 48



No 49



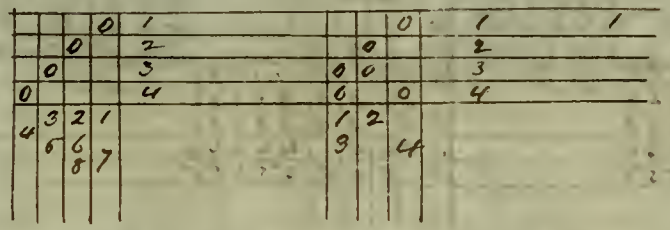
No 50



All running twills may be converted into waved patterns, merely by working over the treadles from side to side, or in a zig-zag manner, and the waved stripes thus formed with run by the length of the cloth - Diamond draughts will produce waved patterns, running across the cloth, by working the treadles over in one direction, as in the running twills - other varieties will be had, by making a little variation in the draught, as in the pillow Twill, which will be found among the following examples

Wave.

No 51.

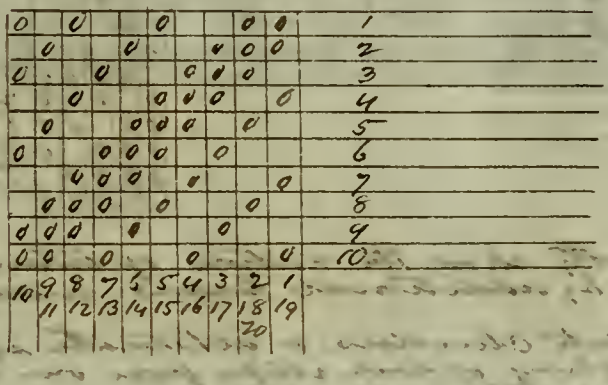


Herringbone

No 52

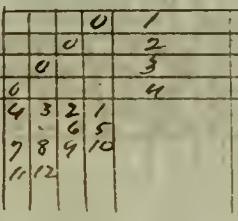
Wave

No 53

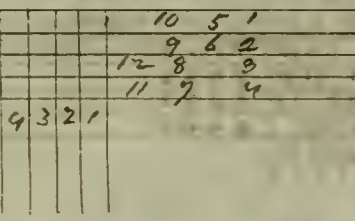


Twill for Pillow Cases or Bed Tick -

No 54.



No 55.



Turned or Reversed Tweeling

In all the regular and broken Twills, the greatest proportion of weft is thrown to one side of the cloth, and of the warp to the other - In a five leafed twill, for example, if the warp were of one color and the weft another, and as there is always one leaf raised and four sunk, it will follow, that four fifths of the weft will appear on the upper side of the cloth, and of the warp below But were the plan of cording reversed, four fifths of the warp would be thrown to the upper side and of the weft below - Changing the appearance by throwing the weft from one side of the cloth to the other, in this manner, is called turning or reversing the twill and is of very extensive application in different branches of weaving, particularly dimities, diapers and damasks which will be explained in their proper places -

Suppose therefore, that a piece of cloth were to be woven in twilled stripes, one stripe the reverse of the other, two sets of twilling leaves would be necessary; and the plans of cording, on the treadle would also be the reverse of each other - The first of these twills, in respect to the number of leaves, is the dimity cord, which is merely the three leafed twill turned a plan of which is subjoined

No 56 Dimity Cord

		0	1 1 1
	0		2 2 2
0			3 3 3
	0	0	1 1 1
0		0	2 2 2
0	0		3 3 3
3	2	1	

In the above plan the first nine threads of warp are drawn upon the back set of leaves, and the other nine on the front set - The raising marks are explained on the back leaves to flush the weft on the upper side of the cloth, and on the front leaves to throw up the warp - The patterns in these fabrics, are formed and regulated entirely by the quantity of warp drawn on each set of the leaves.

Plans of regular and Broken Twills, reversed -

No 57 Regular

			0		1 1 1 1
		0			2 2 2 2
	0				3 3 3 3
0					4 4 4 4
	0	0	0		1 1 1 1
0		0	0		2 2 2 2
0	0		0		3 3 3 3
0	0	0			4 4 4 4
4	3	2	1		

No 58 Satinet

				0	1 1 1 1
			0		2 2 2 2
		0			3 3 3 3
	0				4 4 4 4
0					1 1 1 1
0	0			0	2 2 2 2
0		0	0		3 3 3 3
0	0	0			4 4 4 4

No 59 Regular

				0	1 1 1 1 1
			0		2 2 2 2 2
		0			3 3 3 3 3
	0				4 4 4 4 4
0					5 5 5 5 5
	0	0	0	0	1 1 1 1 1
0		0	0	0	2 2 2 2 2
0	0		0	0	3 3 3 3 3
0	0	0		0	4 4 4 4 4
0	0	0	0		5 5 5 5 5
5	4	3	2	1	

No 60 Broken

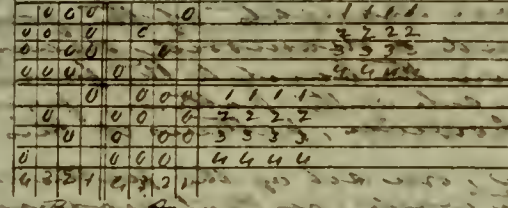
		0			1 1 1 1 1
				0	2 2 2 2 2
		0			3 3 3 3 3
	0				4 4 4 4 4
0					5 5 5 5 5
	0	0	0	0	1 1 1 1 1
0		0	0	0	2 2 2 2 2
0	0		0	0	3 3 3 3 3
0	0	0		0	4 4 4 4 4
0	0	0	0		5 5 5 5 5

These examples will sufficiently show the nature of turned twill stripes, and the varieties may be increased at pleasure, by additional leaves, and by varying the size of one or both stripes -

But to convert twilled stripes into checkers, or alternate squares, another set of treadles are necessary, in order to throw the plushing of each stripe from one side of the cloth to the other - The following plans will show how this is effected

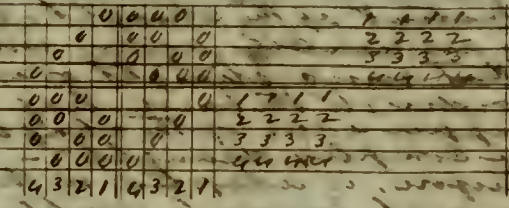
Diced Satinet

No 61.

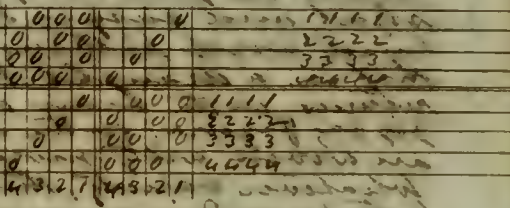


Four leaved Twill Damboard.

No 62

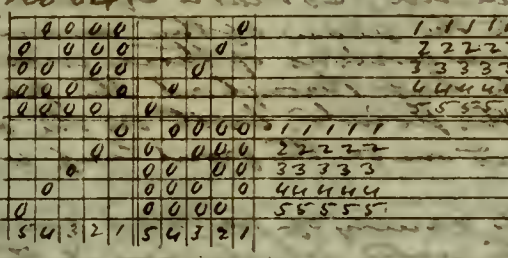


No 63



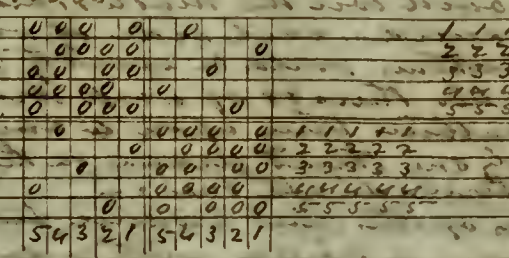
Five leaved Regular Twill Damboard.

No 64.



Five leaved Broken Twill Damboard.

No 65



Here it will be observed, that if the treadles be wrought four times over, or equal to the number of draughts in each space as strips, and again the treadles 5 as before, it will be observed that two rows of squares will be produced, one row the reverse of that beginning with the other, and by repeating this operation, the pattern will assume the appearance of a chessboard, or as it is commonly called a twill damboard.

In making plans of carding for reversed twilling, of which considerable variety may be produced particular care must be taken to avoid placing the raising marks of the different sets or divisions close together at the joinings; for were this not attended to, part of the flushing of one division might be extended over the other by which the lines that divide the parts would not be distinctly defined This will be better understood by comparing plans No 62 and 63. in which it will be observed that there is a raising mark on treadle 1 right hand set, for the back leaf of the front mounting placed immediately contiguous to the raising marks on the back set, which continues the flushing of the back division into the front one, making an unevenly side similar to the tufting of purse spots; and if the same figure be inspected with attention, it will be found that there is no possible way in which these divisions can be joined, but the flushing of one division will run into the other, both by the warp and weft. The most simple rule to find if these cardings be correct, is to fold one division over the other in both directions, and if the raising marks in one compartment or division, fall exactly on the sinking marks of the other, this imperfection will be avoided.

Lined Work.—

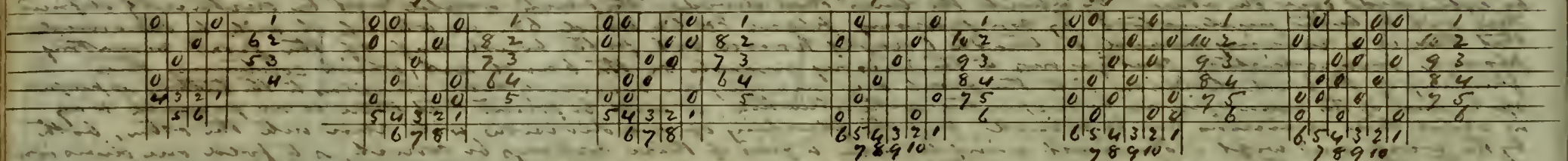
From the preceding examples of Fancy Lining, the transition to lined work is short and easy.— Instead of the straight, or over and over draught of the former, lined work patterns are usually woven with what is termed a diamond draught that is, a draught that runs straight over the leaves from the bound to the front, but returns in the same order, to the back leaf again for one set of the pattern, forming a zig zag figure on the upper edges of the draught.— Sometimes, however, patterns of this kind are woven with more complex draughts.—

Whatever variety, therefore, is adopted in the corded plane; one set of the pattern will by the preceding arrangement, be nearly double the extent by the warp, of that produced by a single draught, but the additional part will be inverted; and as the threads are twice wrought over, the figure will be again nearly doubled by the weft, the latter part which is formed by returning back over the threads, being likewise inverted; so that a square diamond figure is commonly produced, each side of which is equal to the beam of the raising mark on the threads.— These patterns would be exactly four times the dimensions of those arising from the single draught, were two threads of weft drawn upon each leaf throughout the pattern but in general, these patterns have upon a single thread at the points, both in the warp and weft, so that there is only one thread drawn on the back leaf and one on the front leaf while there are two on each of the intermediate ones.—

The smaller mountings of this kind produce but a very limited variety of patterns commonly a small diamond or lozenge figures, with a dot or spot in the centre which gives it the resemblance of an eye; hence these figures are generally denominated bird-eye patterns.— When the mountings however extend to eight leaves and upwards they admit of considerable diversity in flushing, twilling and blind figures deviating from the formal figures of the bird-eye and which now assume the appearance of what is called lined work.—

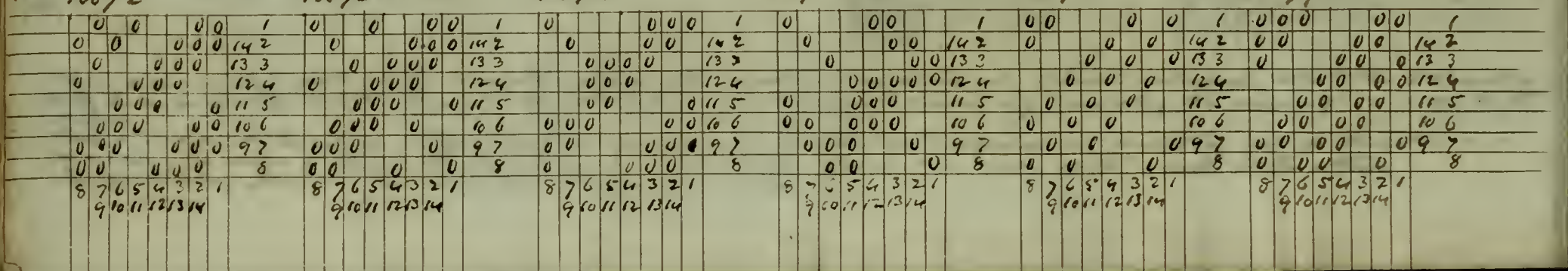
Bird-eye Patterns.

No 66 No 67 No 68 No 69 No 70 No 71



Lined Work Patterns — Eight Leaves.

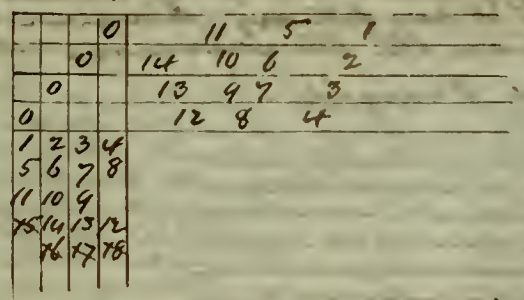
No 72 No 73 No 74 No 75 No 76 No 77



Double Triple & Draught

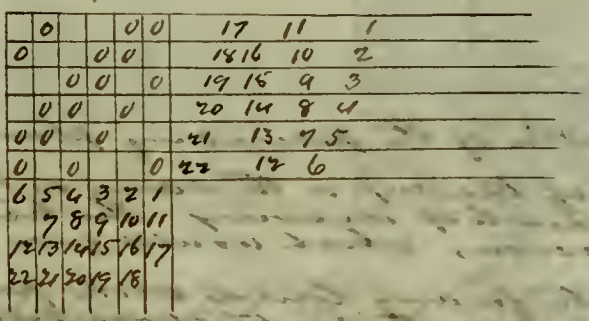
As every extension of the draught in this manner however enlarges the figure in duplicate proportion, that is as the square of the number of threads in one rest of the draught, such patterns will when the leaves are numerous, occupy a considerable space on design paper. The following figure is a plan of what is usually called a double draught and which is only the diamond draught inverted

No 78. Des. No. Double Draught



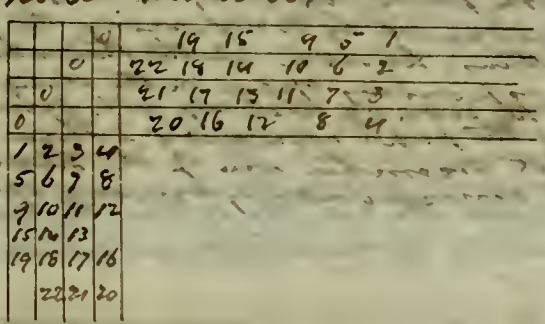
The double draught whatever plan of cording is adopted always produces two square or diamond figures, one within the other, which are again imbosomed by others of the same kind, formed by the inverted part of the draught. The following is a plan of the double draught upon six leaves, the cording of which is the same as No 25 in Fancy Weaving and No 91 among the bird eye patterns

No 79. Des No



A triple draught enlarges the dimensions of these patterns still further, producing in general three similar concentric figures, which are also imbosomed by others of the same kind where the draught is inverted as is represented in Design No 60. The following is a plan of this draught on a scale of four leaves, with one end pointed and three round, but it is evident that much diversity will arise here also, by varying the arrangement of the cords on the treadles

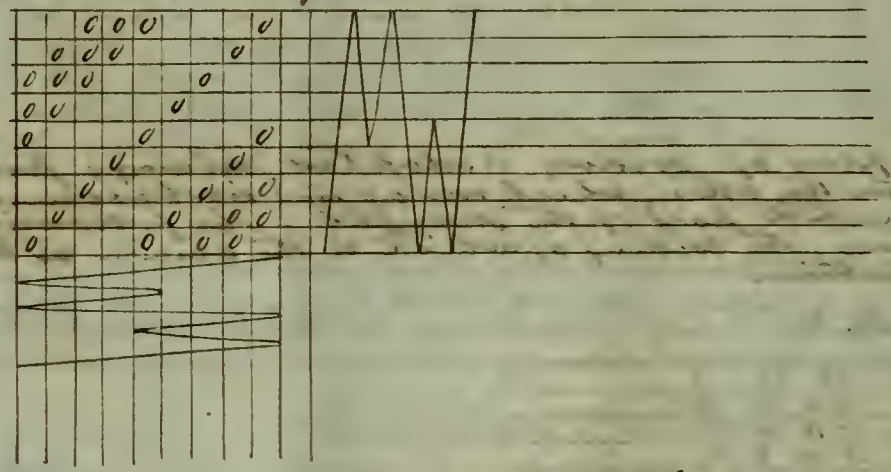
No 80 Des No 60.



From this example it will appear that any number of concentric figures may be formed by repeating the draught any number of times over the leaves in one direction and returning in the contrary direction as often; so that, should the draught diverge from the centre of the cloth towards each selvage, and the treading continued to the same extent, the pattern would be one great figure composed of concentric squares, whose dimensions and variety would depend on the number of leaves, and the arrangement of the raising cords.—
Another method of diversifying the draught of lined wool patterns is, by dividing the leaves and drawing a few sets of the diamond draught on each portion alternately. This arrangement throws the group of small figures produced by each set of the leaves into alternate squares somewhat resembling the dameboard pattern.— It is customary, however to introduce an odd leaf into these movements, immediately between the two divisions which serves as a point leaf to both sets

Alternate diamond draught—

No 81 Design No 63



The lines drawn over the leaves and treadles of the preceding plans show the succession of the draught and treading.
In all the preceding patterns, the order of treading is the same as the draught, which indeed is the common practice in this branch of weaving. The treadles, however, might be wrought over in various other successions, which would give a proportionate effect to the patterns.—
To find the number of leaves requisite for any lined wool pattern, from the cloth or design paper, count the threads or spaces from the centre of one figure to the centre of the embossoming one, including the two points; and this will be equal to the number of leaves and if a square be formed of which this is the diagonal, it will give a representation of the ending of the treadles.
But if a draught and cording be given to represent the pattern on design paper, first make a figure exactly the same as that formed on the treadles by the raising marks, and this repeated four times, but inverted, so that any corner of the cording plan may be the common centre and allowing only one thread for each of the points; both by the warp and weft it will give one complete set of the pattern which will be evident by comparing the plans with their respective figures.—
In the more complex patterns, however, if the thread of warp be numbered in the draught, each thread will have its corresponding space on the design paper; counting from right to left. The numbers also which point out the order of treading will correspond with the threads of weft which are to be counted from the bottom of the paper upwards.— Then observe what threads of warp are raised by each treadle, beginning with number one of the treading and taking the others in their order; and these marked on the corresponding spaces of the design paper will form one set of the pattern

Dornic & Diaper –

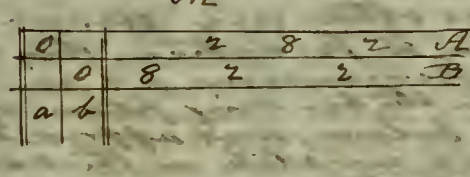
Having explained the method of turning or reversing the twill, both when the sum of the shafting is equal and when it is broken, we now come to apply this principle to the production of an extensive variety of fanciful patterns, which are partly known by the name of dornic and partly by that of diaper –

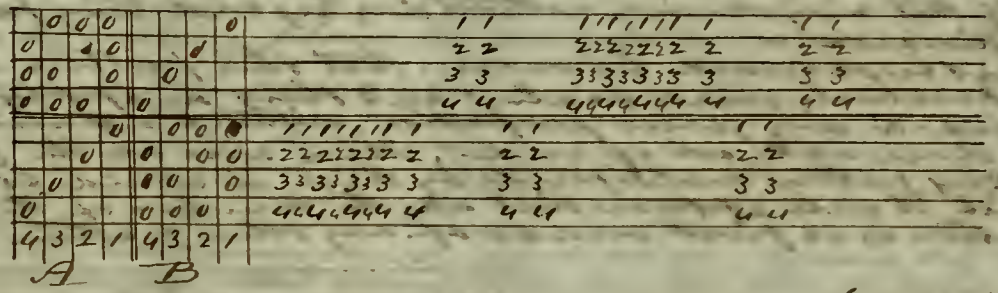
This branch of weaving was chiefly confined to the manufacture of table linens, till of late, that it has been applied to certain species of shawls, in the cotton manufacture, the warp and woof of which are in general of different colors – The coarser sets of table linens, and which require the least mounting, having only a four leaved twill are usually termed dornic, but the finer kinds which are woven by a more extensive apparatus and in general with a twill of five leaves are called diaper – As these patterns, however, are all wrought on the same principle, namely reversing the twill, this distinction merits no farther regard, than that the smaller mountings be first explained and the others in order as they become more complex –

The most simple pattern of this kind is the dambrand or chequer design No 77 which has been already explained, but such draughts instead of forming squares may be broken into an indefinite number of parts of various dimensions and when the whole of this variety contained in one set of the pattern is woven square, which is effected by following the same order of succession in treading as is observed in the draught, or any other succession which fancy may suggest, an endless diversity of figures may be produced merely by two sets of the treading leaves –

The following plan, which may be taken for an example is the draught and cording of a very common pattern in this branch of weaving and the figure it produces is represented by design No 78 –

No 82 Design No 78.





This draught and cording are adapted to the four leaved biassed twill, the cording being the very same as that of checker; but, it will be obvious from the examples given under the article, twisted treading, that the same figure may be produced by a twill of any other number of leaves, and woven either by the regular or broken method of treading – When two or more sets of treading leaves are thus employed, the mounting is said to consist of two or more divisions; and the draught and cording of such mountings are usually marked on one leaf and treadle for each set or division, which are sufficient to exhibit all the design – This is called the binding plan; because it binds as it were all the several divisions together, which are at any time to be raised and brings all that is essential in the pattern into a small compass, so that the weaver has only to substitute one set of treading leaves and treadles, whatever number may be employed, for each leaf and treadle in this plan –

This will be apparent by comparing the preceding draught and cording with the corresponding draught marked M in which it will be observed that on the basis set of leaves A there are two draughts which are marked 2 on the band leaf of M – then 2 over the fore set B which are marked in the same manner on the front leaf of M – Then are succeeded by eight draughts on the set A two on the set B two on the set A and eight on the set B all of which are set down in figures respectively on the binding plan M –

When the four treadles A cross the leaves or divisions marked A, the greatest portion of raising marks are placed, or that division is said to be raised, in order to reverse the twill: a raising mark is therefore placed in the corresponding square of the binding plan on the treadle marked A. The same is to be observed with respect to the leaves and treadles marked B: and this table plan is to all those plans which are given in the contracted form, whatever number of divisions they may contain.—

In weaving this pattern the treadles A are worked twice over between reversing the twill in such parts of the pattern as are drawn on the least division and, by following the succession of draught, the treadles B are worked twice over eight times over the treadles A and so on till the figure be weaven, after which the same succession is repeated.—

When domick or diaper patterns are drawn on design paper, each unit in the binding draught one space by the warp: so that each of these spaces may contain four and sometimes five threads, according as it is intended for domick or diaper, or fineness of the reed, and these are generally drawen through one interval of the reed—the draught by the weft, likewise contain a corresponding number of shots, or ones over the set of treadles heddles.—

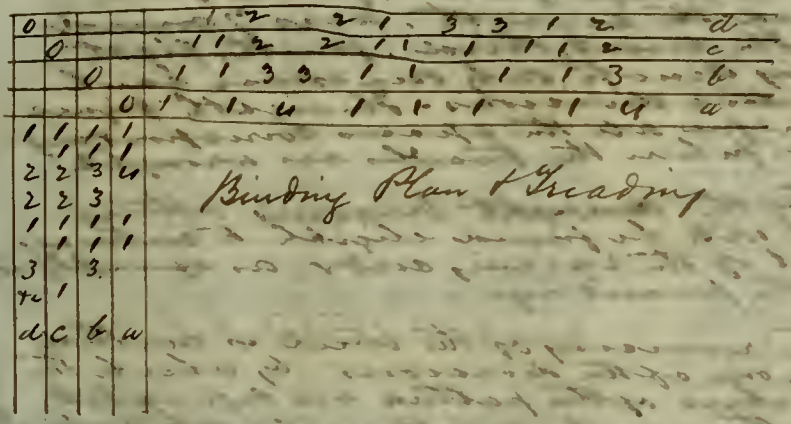
Keeping still in mind the general rule, that all patterns formed by the warp are produced by the raising cords; let the warp in this example be supposed blue, and the weft white—then the dark shading spaces in the figure will represent the pattern as formed by the floating of the warp above, and the white spaces, those of the pattern where the warp is below.—Hence the two spaces at the bottom of design No 7 8 will represent those parts of the figure which are produced by working twice over the treadles A. the next two spaces, those which are produced by the treadles B. The treadles A again being wrought four times over, form the large squares of eight spaces each way; and so on, with any other variety that may occur, without any regard being paid to the number of working leaves in the division.—

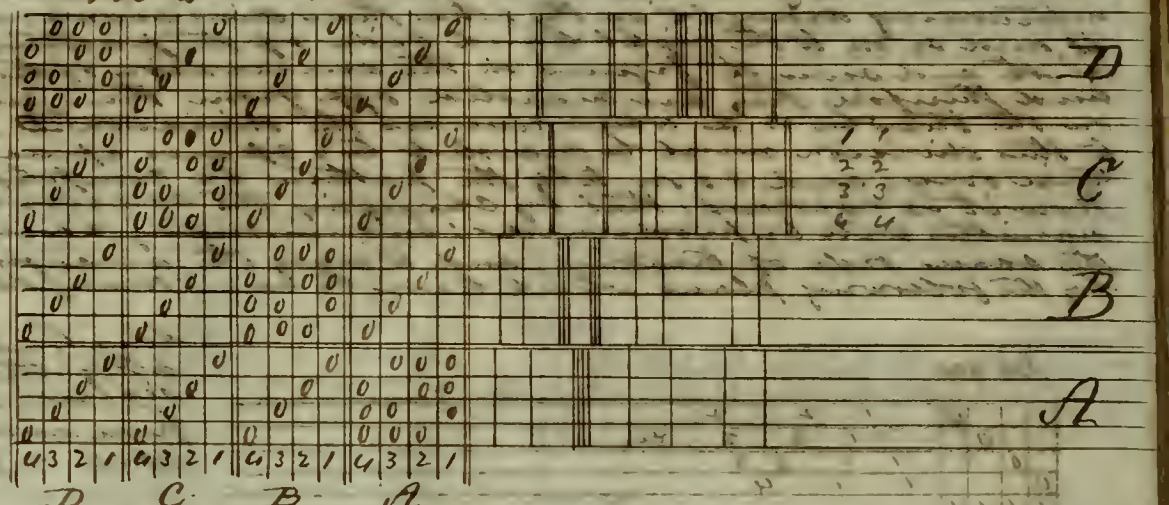
It must be observed however, that this pattern as well as others are drawn on a comparatively small scale; and thus in applying them to practice, they may be enlarged in any given proportion, either to expand their dimensions or to suit them to any desirable set of reed. Thus were all the figures on the binding plans of the preceding pattern multiplied by three, it would stand as below, and afford an example in which it will appear that all the members of the draught are still in the same proportion as at first and so of any other pattern of this kind.—

	6	24	6
24	6	6	

When a still greater variety of pattern is required, the number of divisions must be increased, as in the other branches of weaving.—As these mountings however can only be augmented by adding complete sets of the twill, the varieties arising from an increase of leaves in this, must be more limited than in almost any other branch.—This disadvantage, however, is in a great measure compensated by the ingenious diversity which is usually observed in the succession of the draught, by means of which a style of pattern peculiar to diaper weaving is produced.—

The same draught also will weave a variety of patterns, agreeably to the different arrangements of the raising cords upon the binding plan, and the succession of working over the treadles; and, that diaper mountings may not always be confined to their original draught, the heddles are not, in general strands, as in the former kinds of fancy mountings; but are cast separately, so as to run on the barring a mounted cord, by which the weaver can add or alter them at pleasure, to any pattern he may have occasion to weave.—The following plans which are on a scale of four divisions and four heddles will give an idea of the manner in which a variety of patterns may be obtained from the same draught and succession of treading, merely by a different position of the raising cords upon the treadles.—





In this example, the straight lines which are drawn across the several divisions, denote the draughts over the leaves; that is, each line shows that one thread is to be drawn on each leaf cordings are thus extended, in preference to that of marking the succession of drawing by figures, on account of taking less room - Thus the drawing commences on the band leaf of the division C and is continued until it has gone twice over these leaves, as pointed out by the figures. Thus there are two similar draughts on the leaves D, one on A one on B, one on C one on D and so forth, agreeably to the units in the figures in the binding plans the draught commencing always on the band leaf of each division. -

By following the order of treading ~~it with be observed~~ which is here the same as the draught and which is marked on the treadles of the binding plan at a, b, c and d it will be observed as in the first examples, on what set or division the drawing commences or terminates, which in this plan terminates on the set A, then as there is only one draught over the leaves of this set the treadles are worked once over which are in the binding plan represented by the thumbs & the next division which remains the band is B, and therefore, as there is only one draught in this division they are worked over in like manner, and so on, agreeably to the succession of the draught; always observing, that when there are two three or more draughts in succession on one set of leaves, there must be a repetition of the treading two three or more times, over the corresponding set of treadles. Hence it is plain, that, in working over the first set of treadles A, all the cloth will exhibit the appearance of a regular biassed twill, flushed on the upper side by the weft, except those part of the pattern which are woven by the set of leaves marked A, in which the twill will be reversed, or the warp flushed above. - The same is to be understood of the effect produced by the other sets or divisions. -

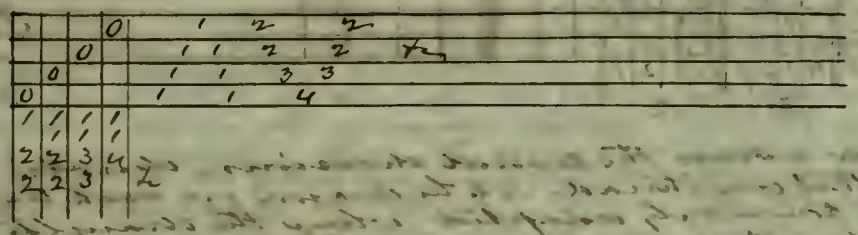
This pattern is represented on design paper by Design 9th. in which as formerly noticed each space from right to left contains four threads of warp or one set of the twill and each space from the bottom upwards contains four shots of weft, or once over on set of the treadles - Hence, from a due consideration of this example, and the plan of treading subjoined, it will be easy to perceive how elegant a diaper patterns, in general may be represented on design paper from the draught. - For, as the figures on the leaves of the binding plan must also have corresponding spaces on the design paper counted from right to left, so also the figures on the treadles must have three respective spaces counting upwards, to represent the weft. - Suppose then, the treadles of the binding plan extended as at a, b, c, d; and, having marked the succession of the draught upon these treadles, we find that the treadle a on which the first figure is placed, raises a number the division a or the set of leaves A in the full mounting; and as the first figure on this treadle is 1, it shows that, as the corresponding treadles are to be wrought only once over, all the figures on this leaf or division a will occupy one space by the weft on the design paper. -

Then mark the first space at the left hand corner of the design, pass 5, for the five intervening draughts on the other three divisions; mark the seventh, pass 7 mark 4 and so on to the right hand side of the pattern. The second, third, fourth, fifth, sixth and seventh figures in the succession of reading denote only one space each and therefore they are marked off from their respective divisions. The eighth figure on the treadles is 2 which reverses the division D; therefore all the spaces corresponding to this division must be marked two spaces upwards, for then the treadles are wrought twice over; and so on till the pattern be completed.

Now it is evident, that by changing the succession of the draught reading other varities will be produced; but in many cases, it will be found eligible to continue the same order of reading, and to vary the arrangement of the raising order, as exemplified by the following plans which have the same draught as the preceding.

Sometimes the reversing of the treadle is omitted altogether by one of the divisions; by which the several members of the pattern are separated from each other, and are formed into distinct spots or figures, as in the annexed example

No 84.



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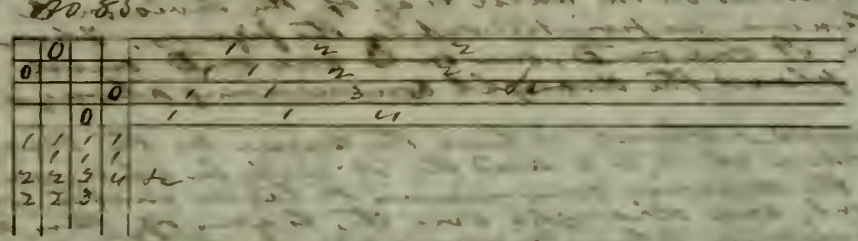

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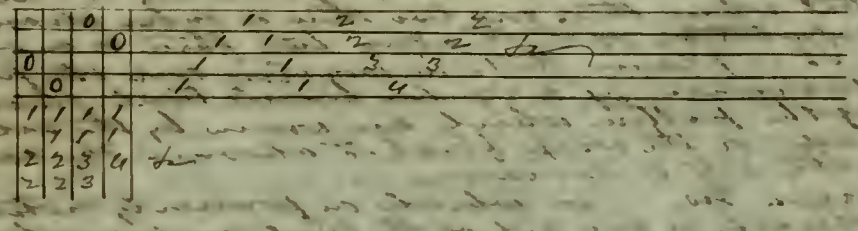

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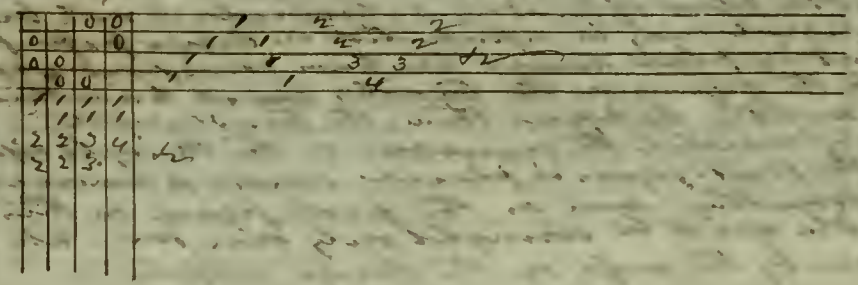

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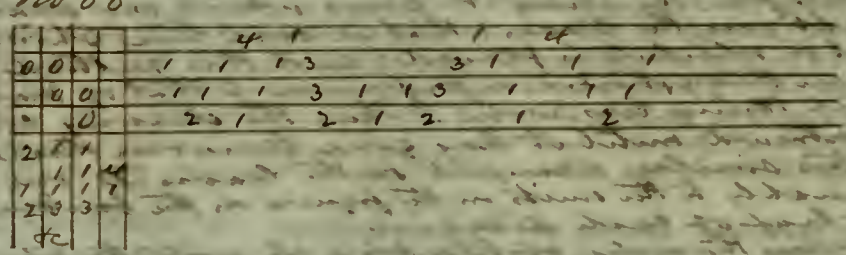
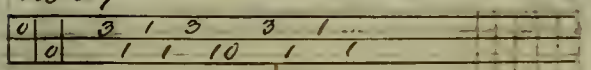


No 88 Full Mounting

A Collection of Diaper patterns from two to seven divisions

No 89



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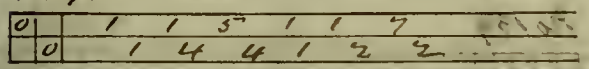

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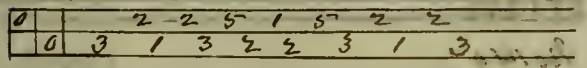

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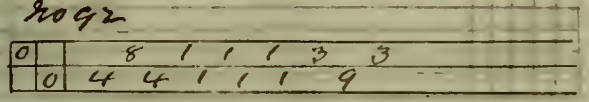

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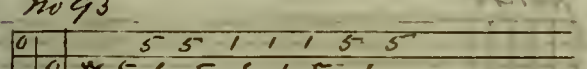

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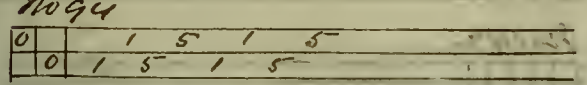

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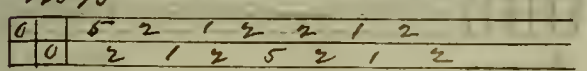

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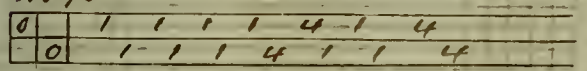

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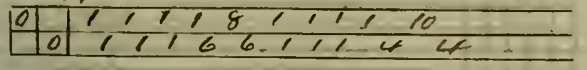

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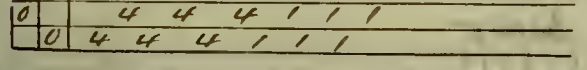

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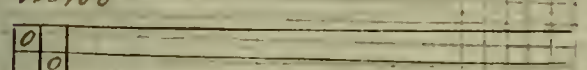

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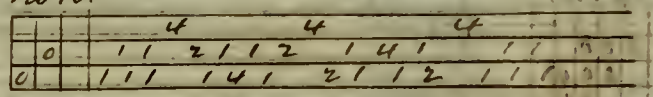

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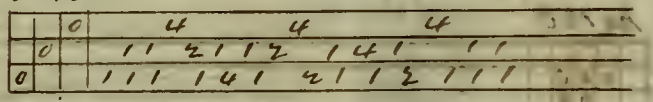

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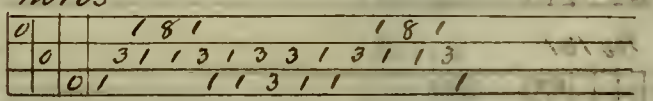

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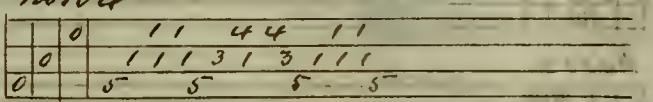

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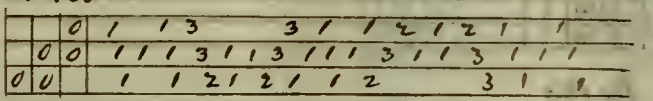

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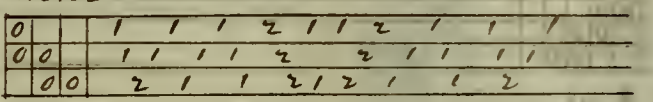

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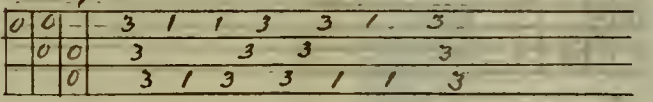

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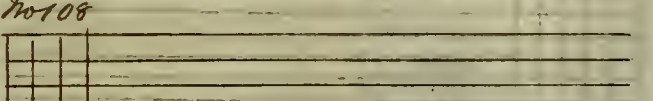

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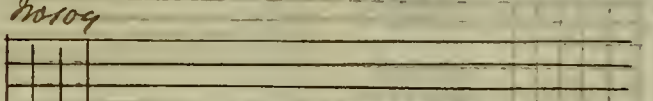

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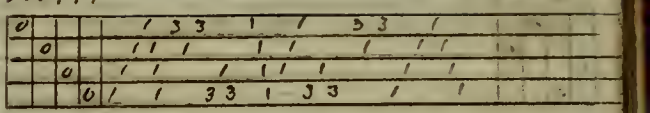

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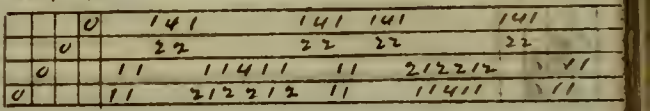

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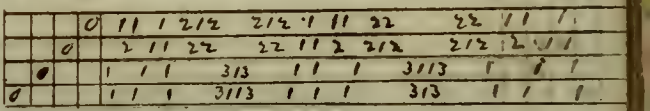

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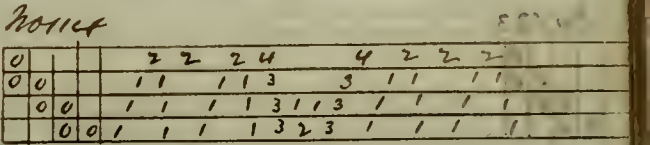

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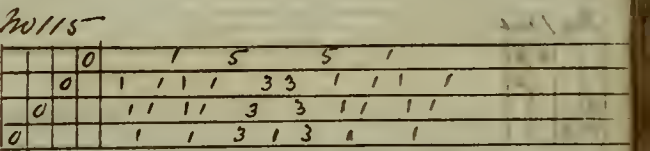

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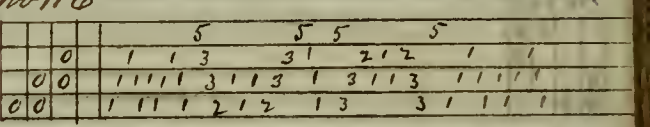

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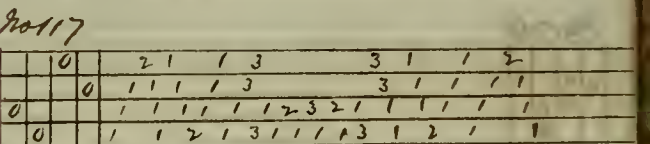

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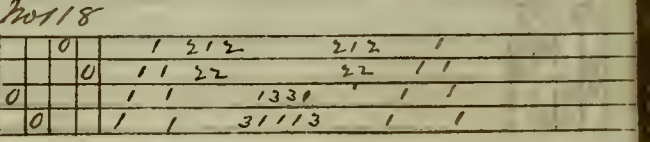

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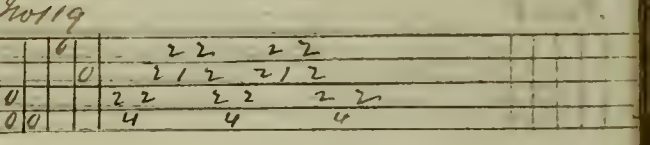

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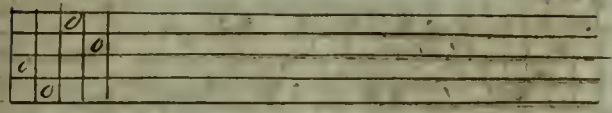

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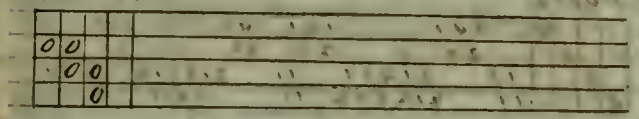

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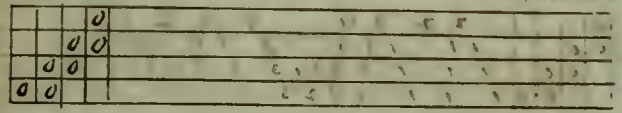
No 123



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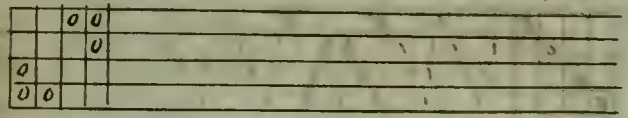

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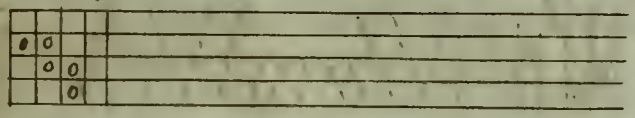

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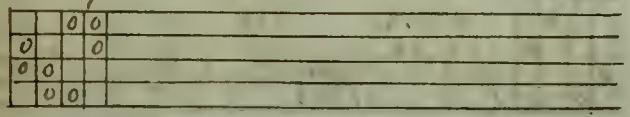

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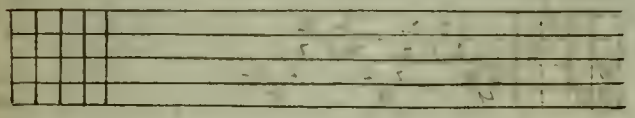

No 129

No 130

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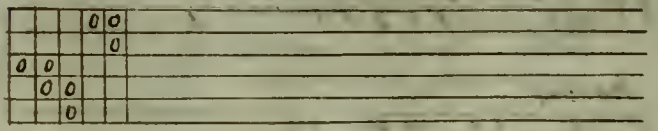

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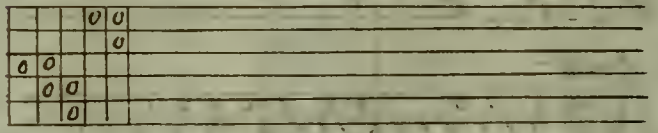

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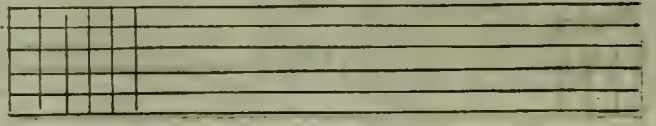
No 134

No 135

No 136



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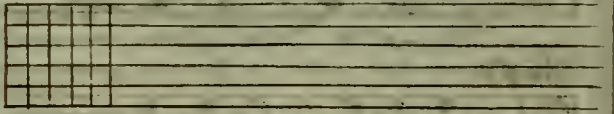

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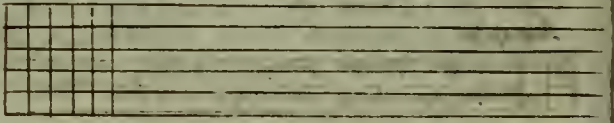

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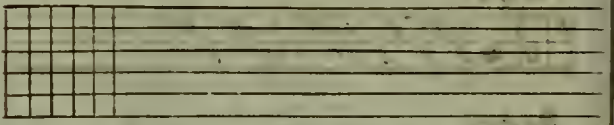

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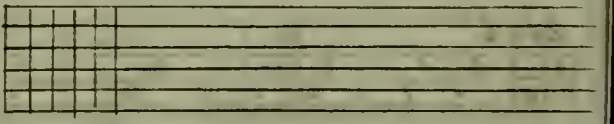

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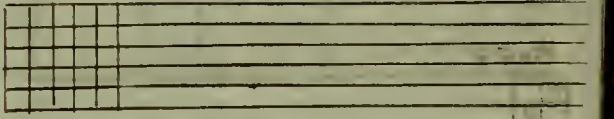

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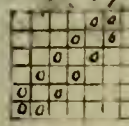

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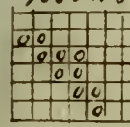

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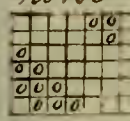
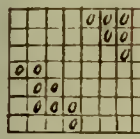


No 151

No 152



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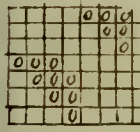

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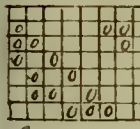

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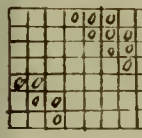

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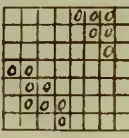
No 157

No 158

No 159

No 160

No 161



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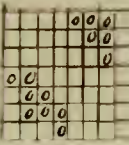

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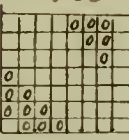


When a border is added to any of these patterns, either for table linen, or shawls, it is only necessary to vary the draught of the border from that of the body; and when working the cross borders, the same order of treading is followed as that part of the draught. — as the following example

Diaper Border

Swivel Body Border

Hibiscus Abelmoschus. N.O. Malvaceæ.

Caaming Tables

I find by observation that of No 30s 2fold Cotton yarn, when plaind closely together there are 120 threads per inch.— The following tables are calculated on the supposition that two thirds of this quantity, is the closest that can be woven

Class 1. Data $\frac{120 \times 2 \times .05}{3} = 4$

Set of Reed	Calculated Counts of Yarn	Single.	2 fold.
2	7.50	0s to 9s	0s to 18s
4	30.00	10s " 22s	19s " 45s
6	61.25	23s " 45s	46s " 90s
8	120.00	46s " 82s	91s " 164s
10	187.50	83s " 114s	165s " 228s
12	270.00	115s " 157s	229s " 315s

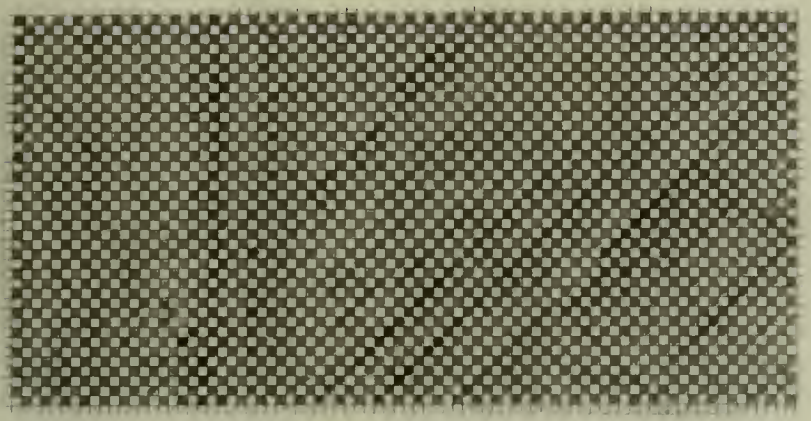
Class 2. Data $\frac{120 \times 2 \times .1}{3} = 8$

Set of Reed	Calculated Counts of Yarn	Single	2 fold
4	7.500		
6	16.875		
8	30.000		
10	46.875		
12	67.500		
14	91.875		
16	120.000		
18	151.875		
20	187.500		
22	226.875		
24	270.000		

DESIGN Nº 1

SHAFTS PICKS TO THE ROUND

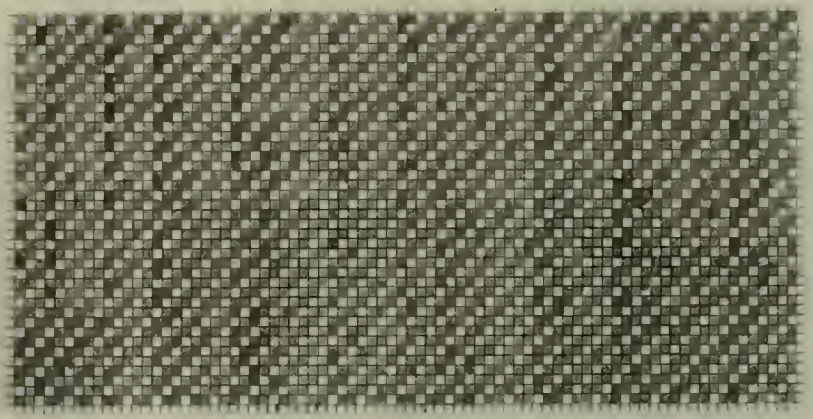
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 2

SHAFTS PICKS TO THE ROUND

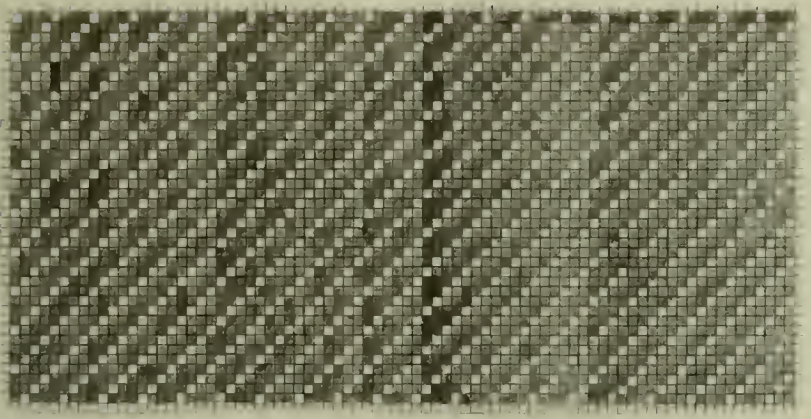
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 3

SHAFTS PICKS TO THE ROUND

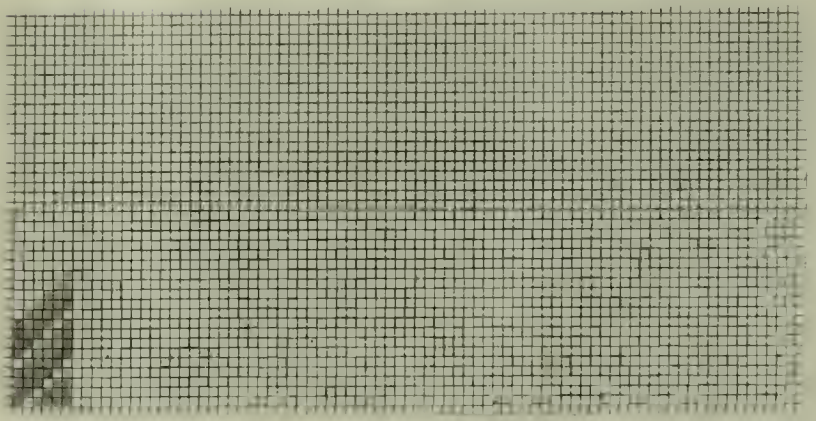
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 4

SHAFTS PICKS TO THE ROUND

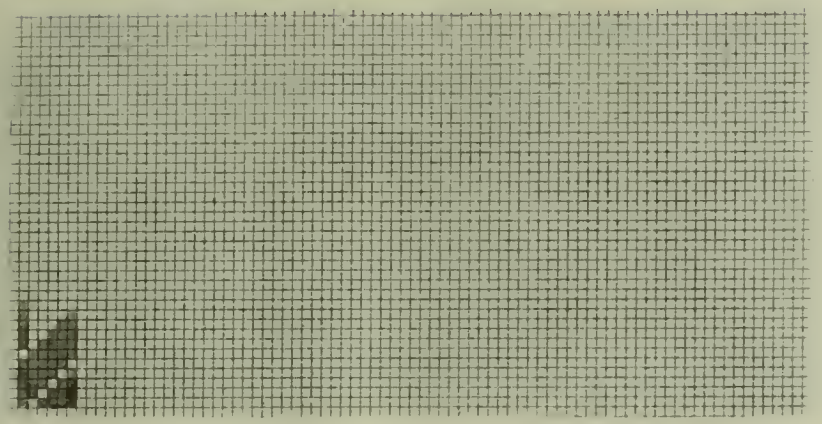
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 5

SHAFTS PICKS TO THE ROUND

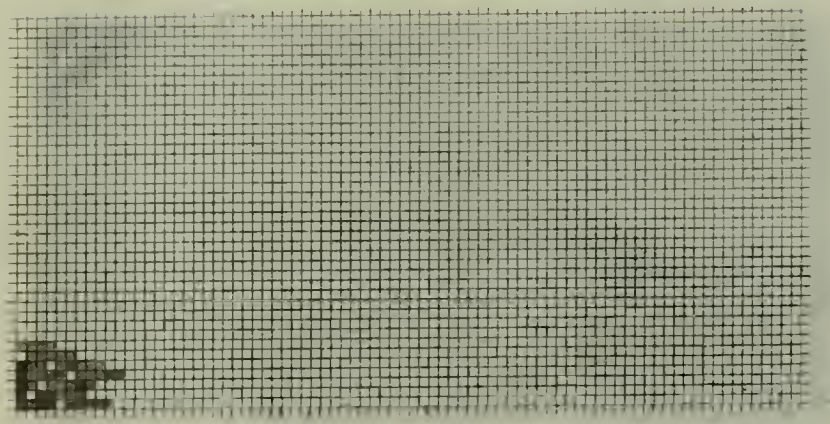
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 10

SHAFTS PICKS TO THE ROUND.

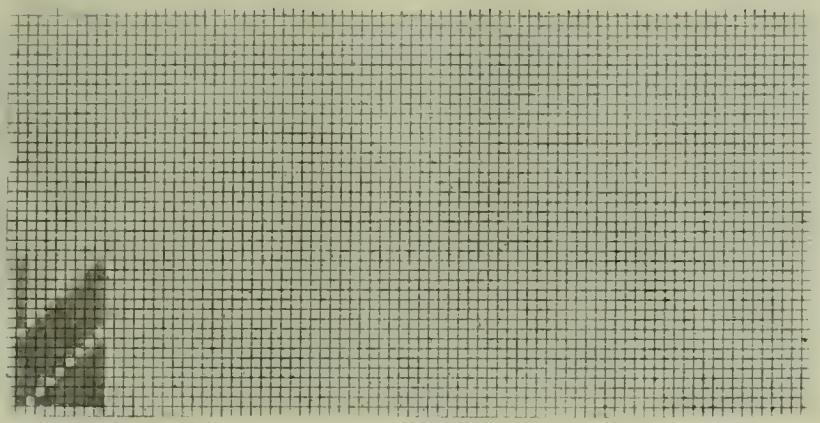
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 7

SHAFTS PICKS TO THE ROUND.

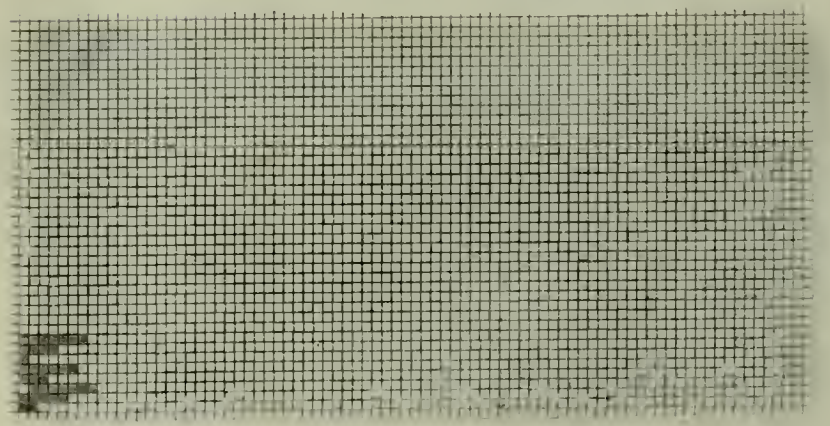
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 12

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK. WEFT. WHITE. WARP.

DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK. WEFT. WHITE. WARP.

DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK. WEFT. WHITE. WARP.

DESIGN No

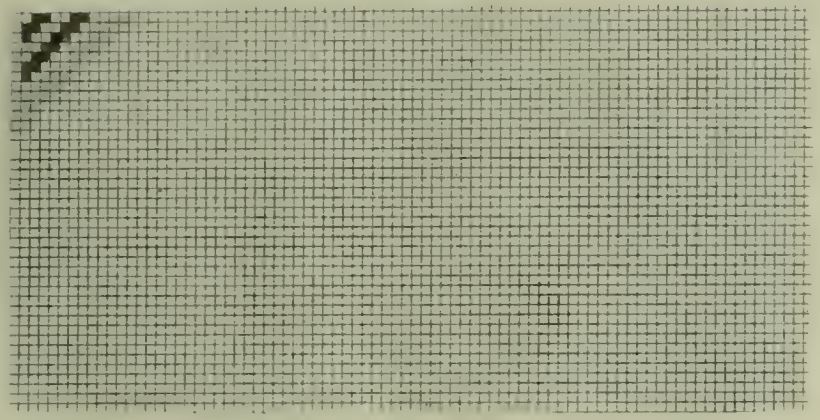
SHAFTS PICKS TO THE ROUND

BLACK. WEFT. WHITE. WARP.

DESIGN Nº 13

SHAFTS PICKS TO THE ROUND

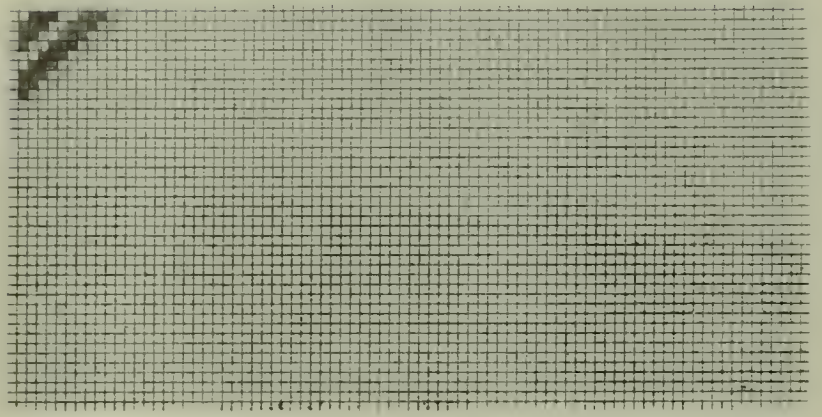
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 14

SHAFTS PICKS TO THE ROUND

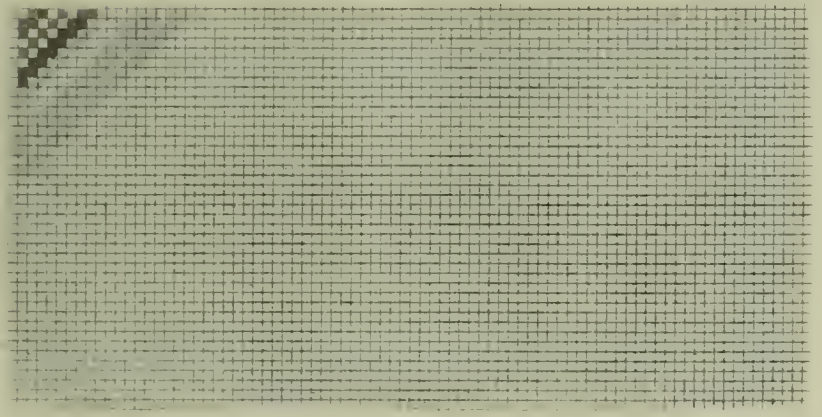
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 15

SHAFTS PICKS TO THE ROUND.

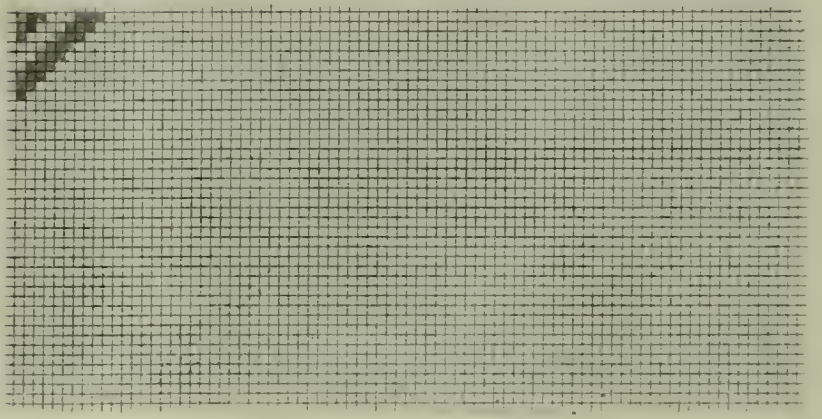
BLACK. WEFT. WHITE, WARP.



DESIGN Nº 16

SHAFTS PICKS TO THE ROUND.

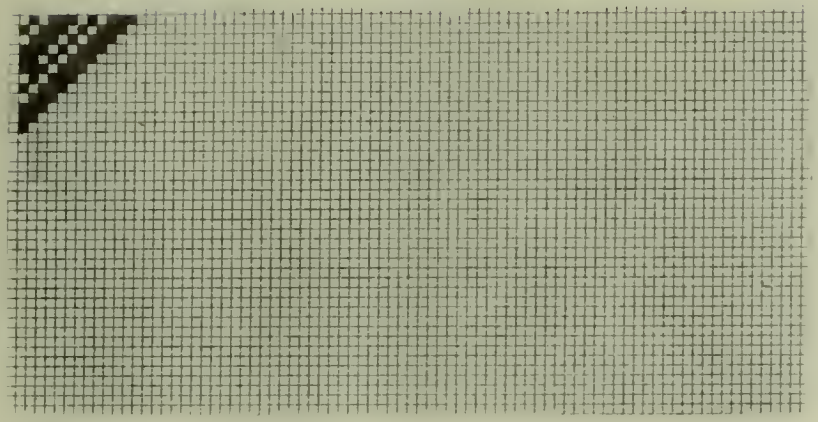
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 17

SHAFTS PICKS TO THE ROUND.

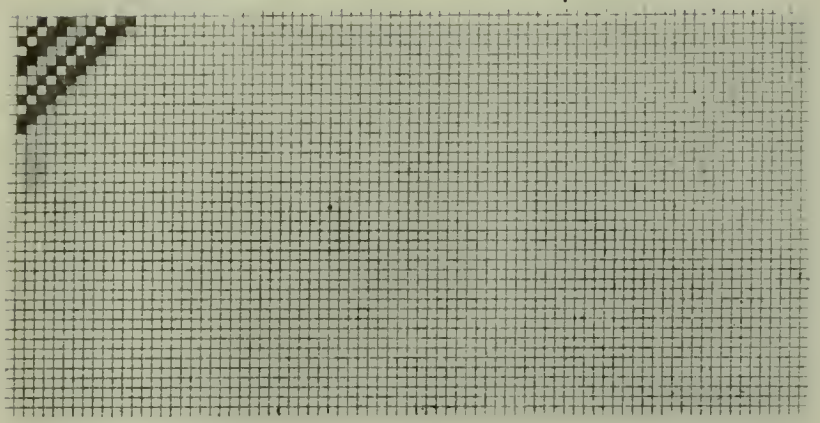
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 18

SHAFTS PICKS TO THE ROUND.

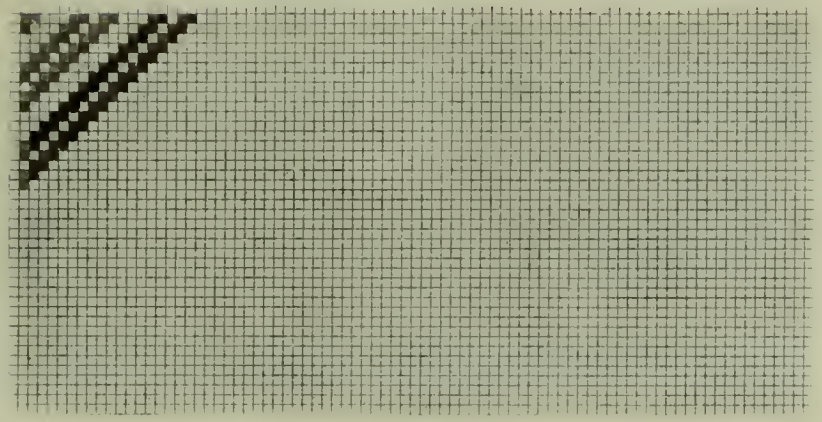
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 19

SHAFTS PICKS TO THE ROUND.

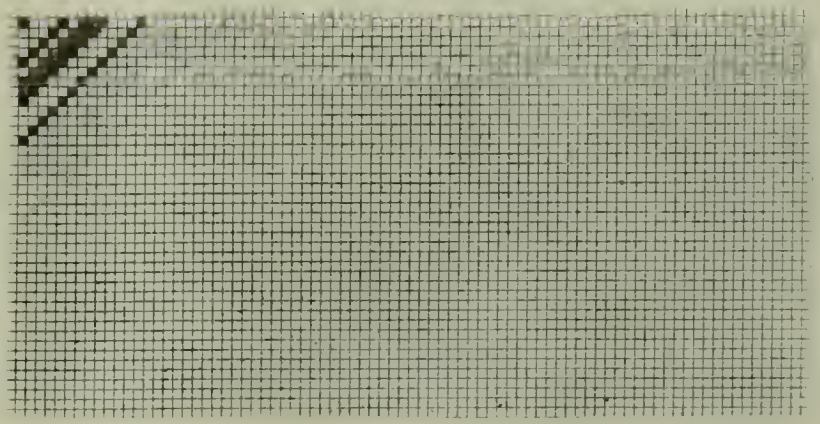
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 20

SHAFTS PICKS TO THE ROUND.

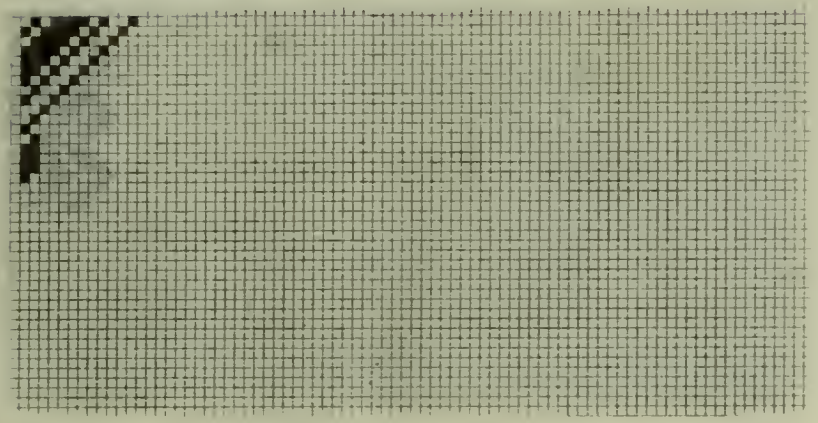
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 21

SHAFTS PICKS TO THE ROUND.

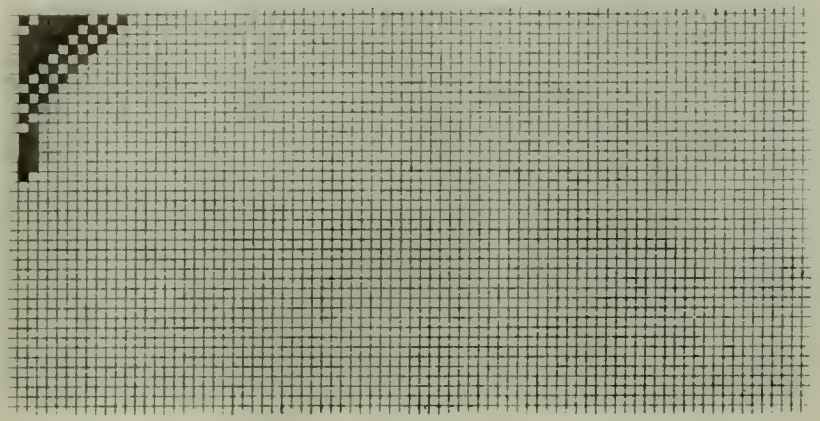
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 22

SHAFTS PICKS TO THE ROUND.

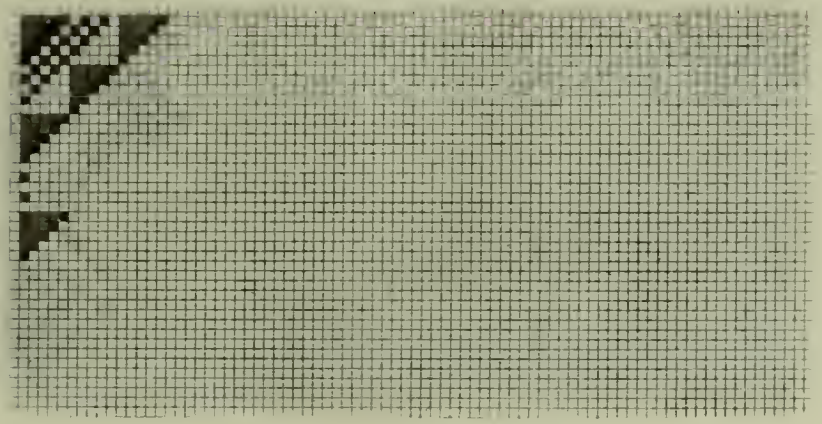
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 23

SHAFTS PICKS TO THE ROUND.

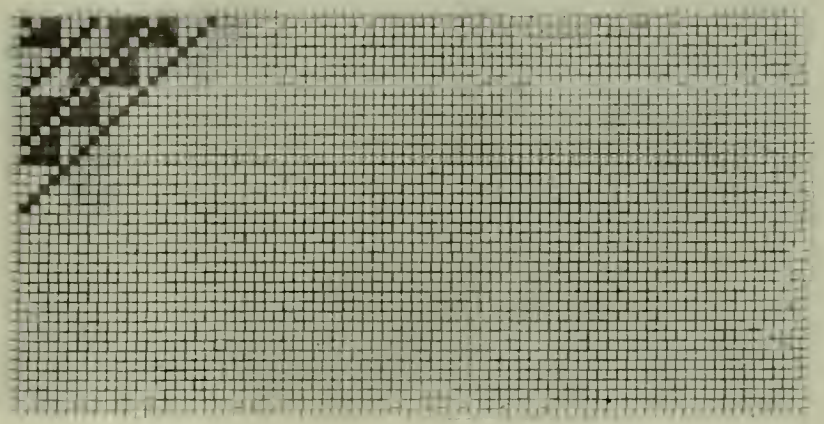
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 24

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No 27

SHAFTS PICKS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN No 28

SHAFTS PICKS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN No 29

SHAFTS PICKS TO THE ROUND

BLACK WEFT WHITE WARP

DESIGN No 30

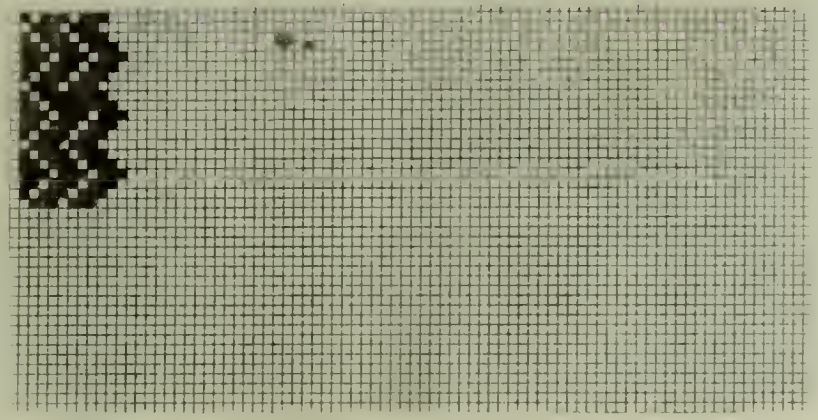
SHAFTS PICKS TO THE ROUND

BLACK WEFT WHITE WARP

DESIGN No 25

SHAFTS PICKS TO THE ROUND

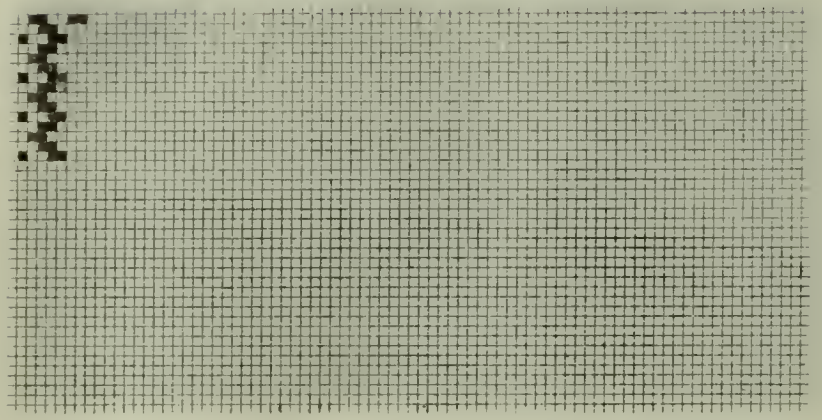
BLACK, WEFT. WHITE, WARP.



DESIGN No 26

SHAFTS PICKS TO THE ROUND.

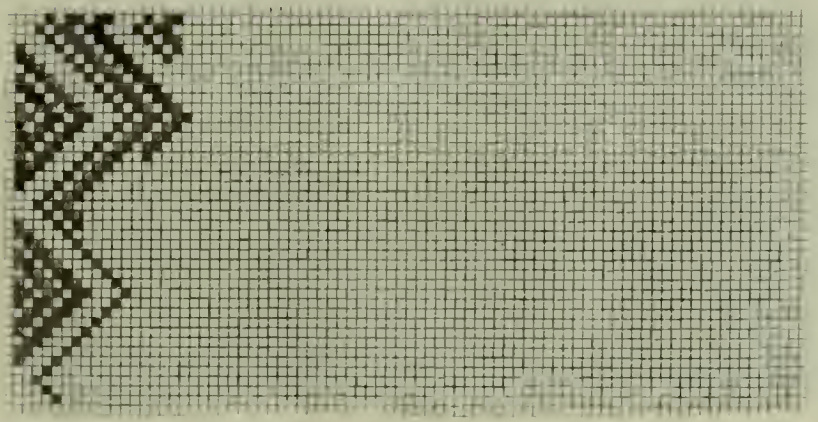
BLACK, WEFT. WHITE, WARP.



DESIGN No 27

SHAFTS PICKS TO THE ROUND.

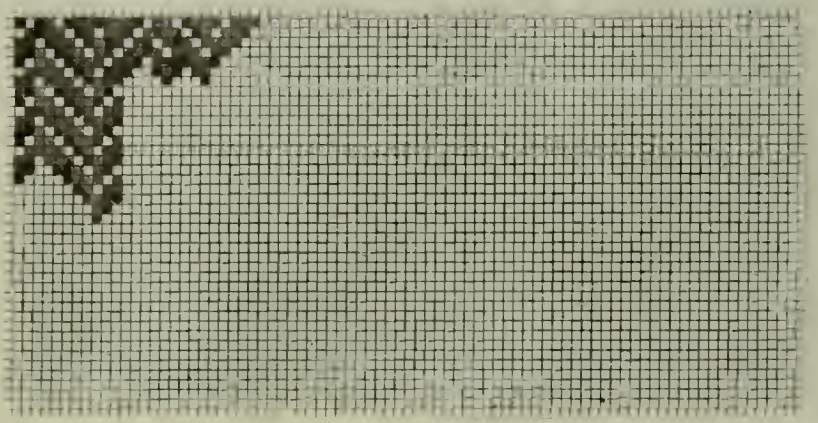
BLACK, WEFT. WHITE, WARP.



DESIGN No 28

SHAFTS PICKS TO THE ROUND.

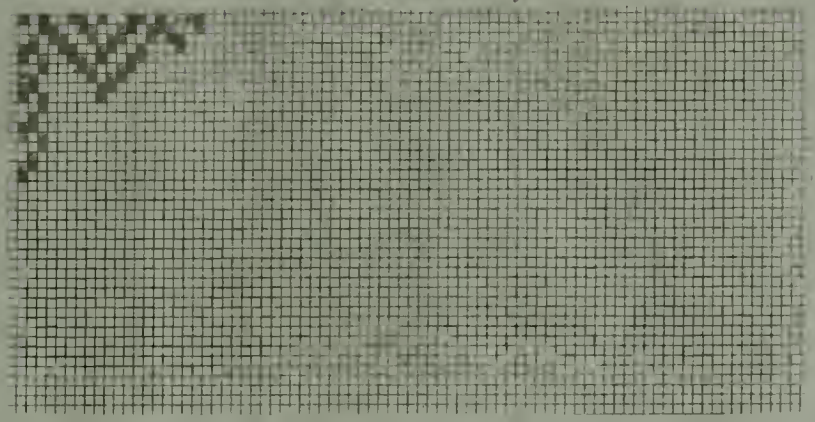
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 29

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN Nº 30

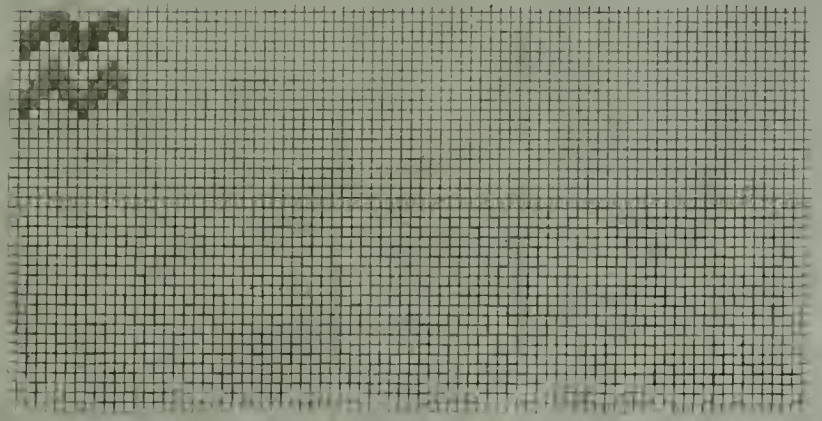
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.

DESIGN Nº 31

SHAFTS PICKS TO THE ROUND.

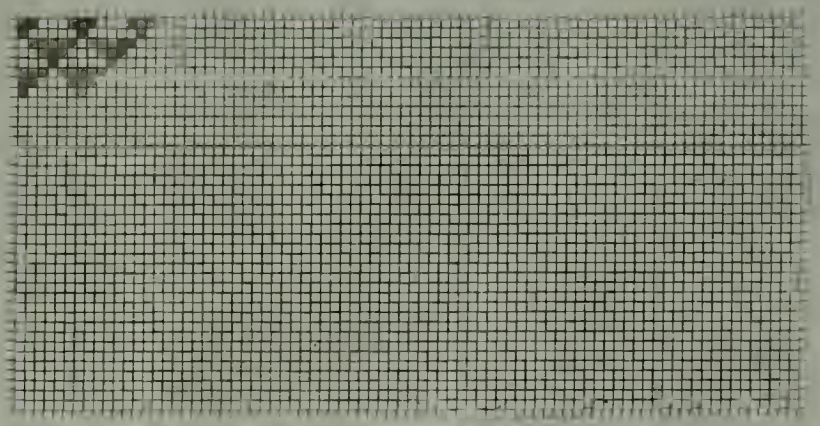
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 32

SHAFTS PICKS TO THE ROUND.

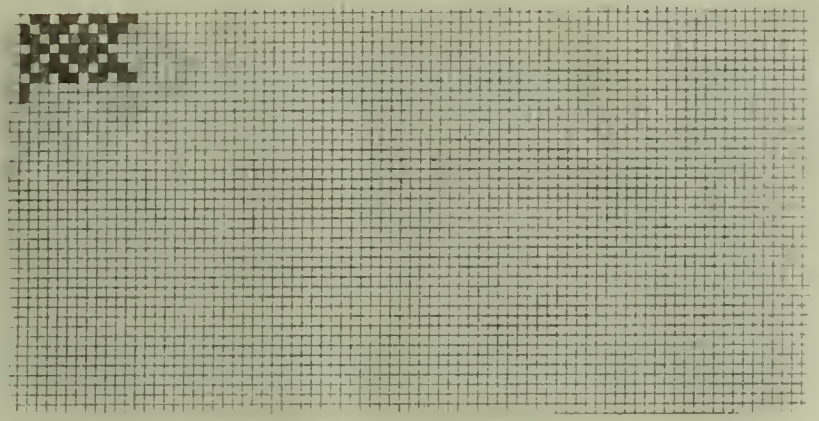
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 33

SHAFTS PICKS TO THE ROUND

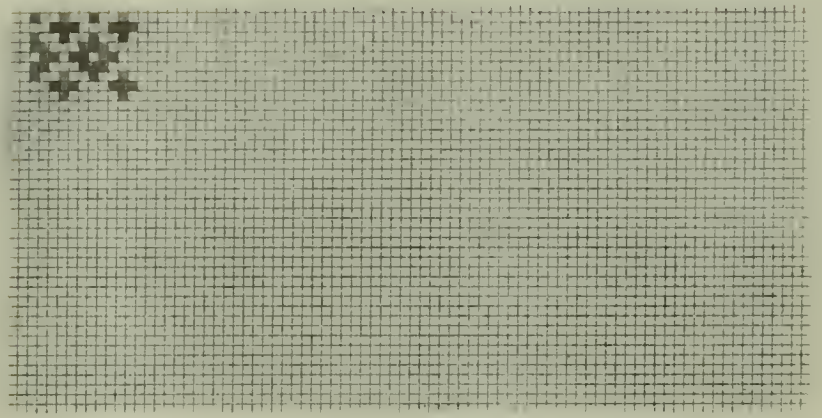
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 34

SHAFTS PICKS TO THE ROUND.

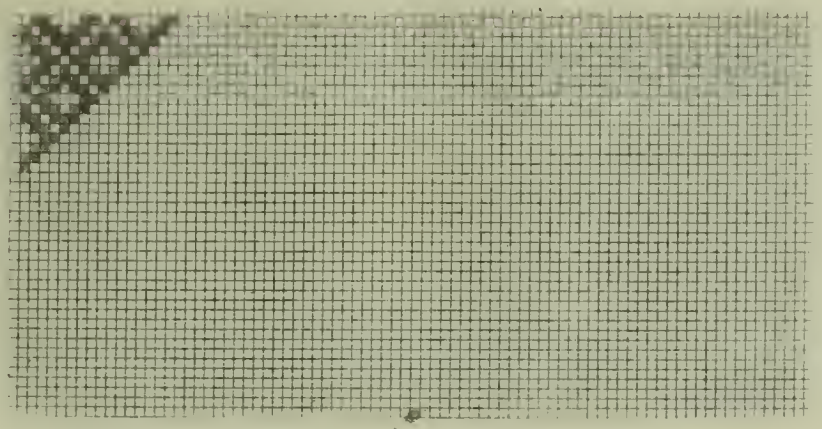
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 35

SHAFTS PICKS TO THE ROUND

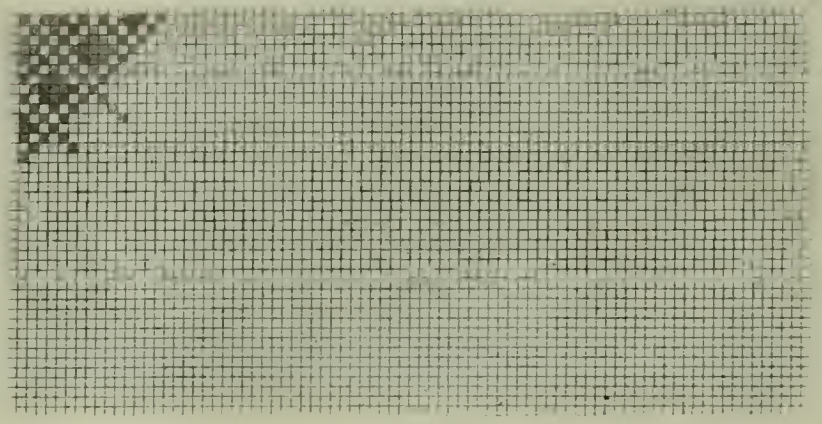
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 36

SHAFTS PICKS TO THE ROUND.

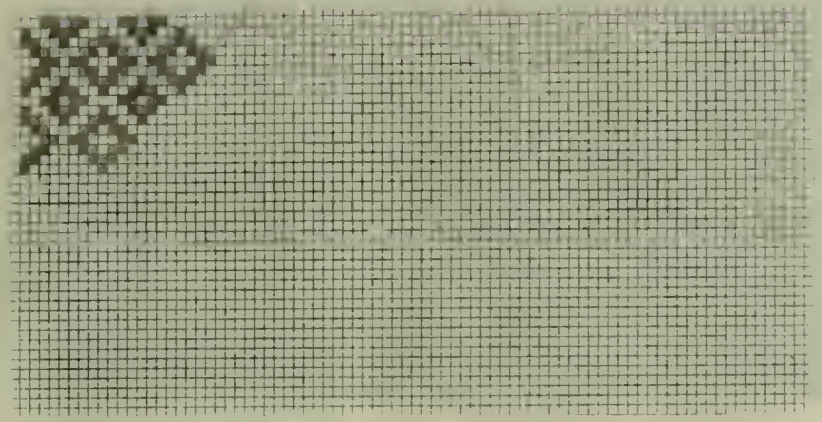
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 37

SHAFTS PICKS TO THE ROUND

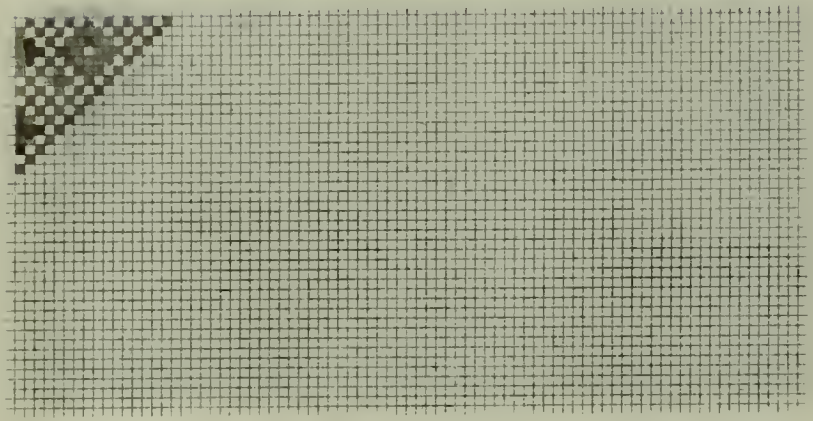
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 38

SHAFTS PICKS TO THE ROUND.

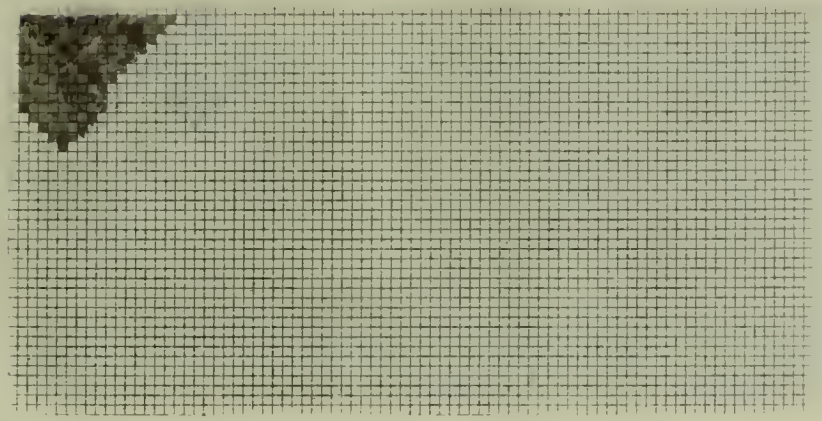
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 39

SHAFTS PICKS TO THE ROUND.

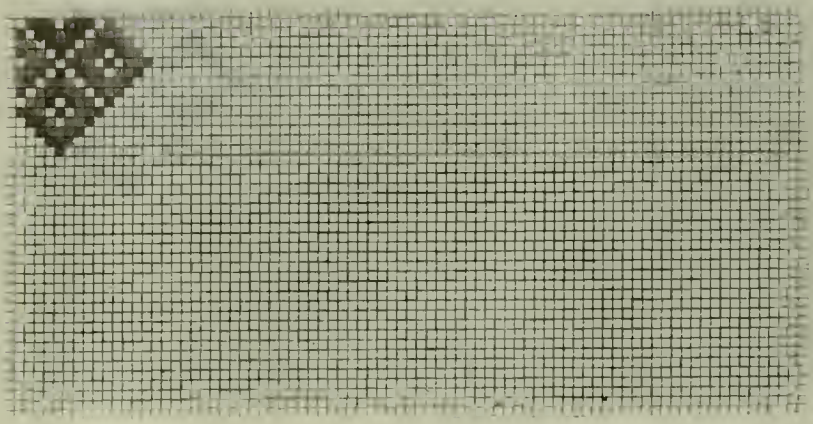
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 40

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No 3.

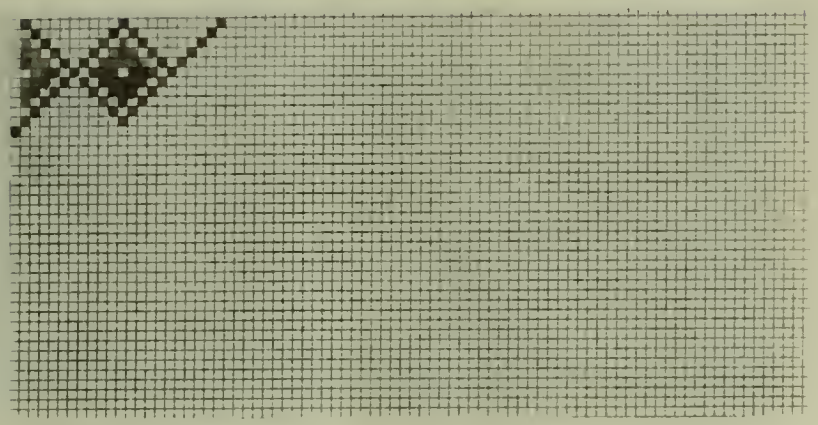
SHAFTS PICKS TO THE ROUND

BLACK WEFT, WHITE, WARP.

DESIGN Nº 41

SHAFTS PICKS TO THE ROUND

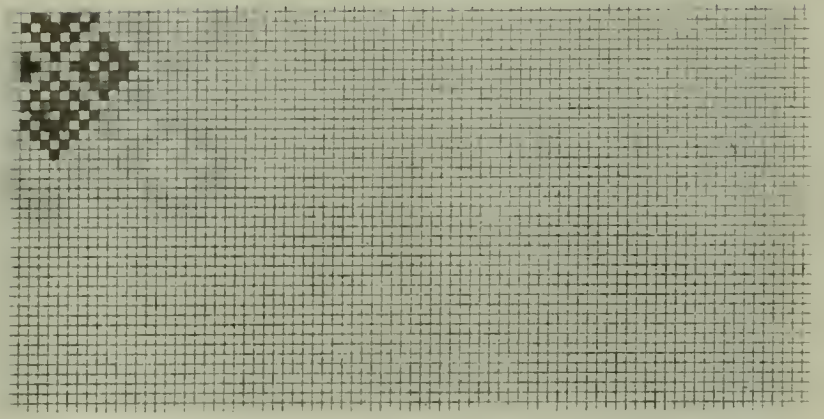
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 42

SHAFTS PICKS TO THE ROUND.

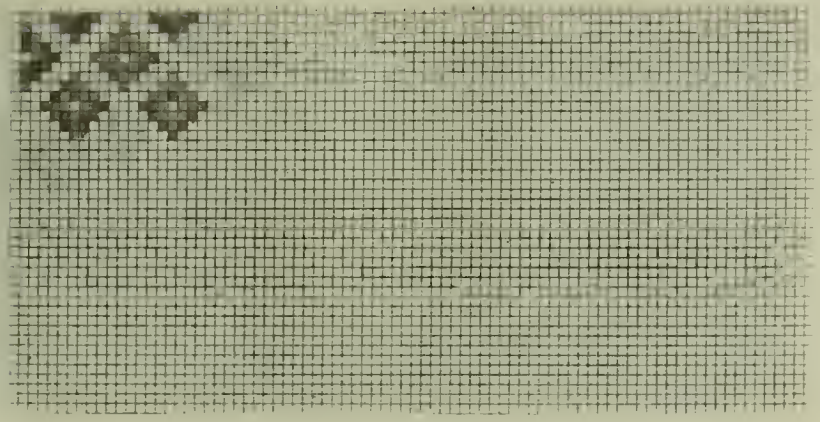
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 43

SHAFTS PICKS TO THE ROUND.

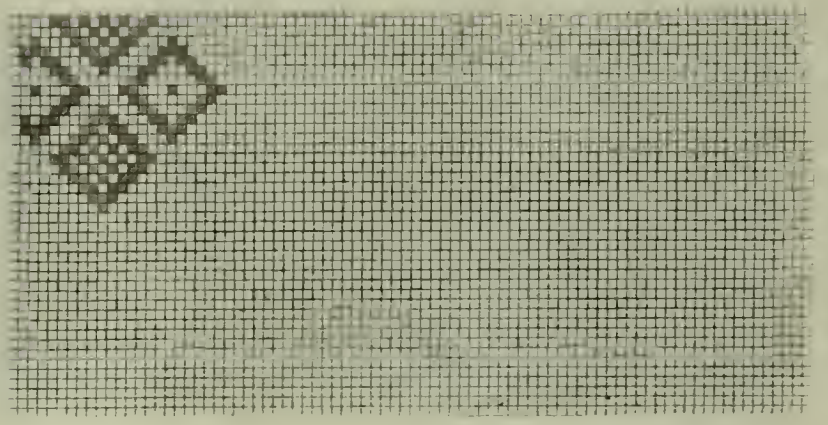
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 44

SHAFTS PICKS TO THE ROUND.

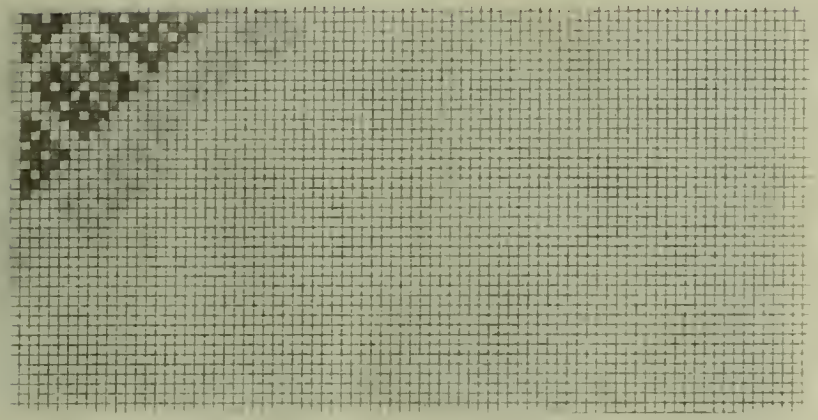
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 45

SHAFTS PICKS TO THE ROUND

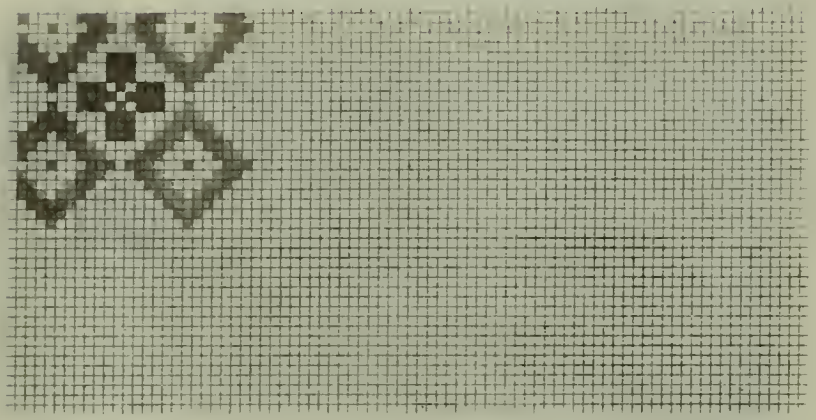
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 46

SHAFTS PICKS TO THE ROUND.

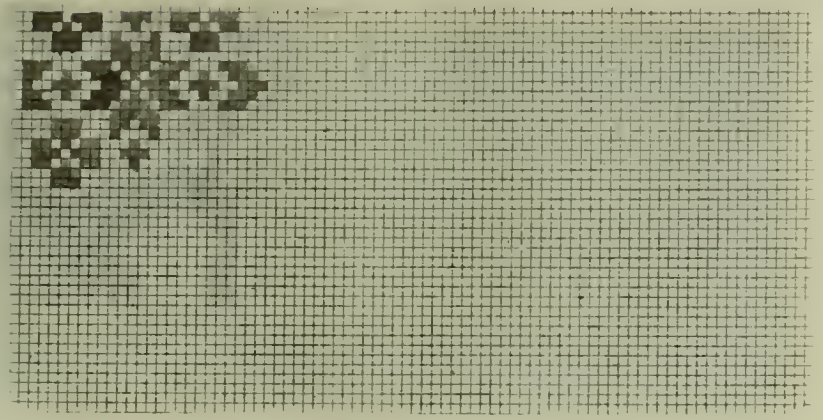
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 47

SHAFTS PICKS TO THE ROUND.

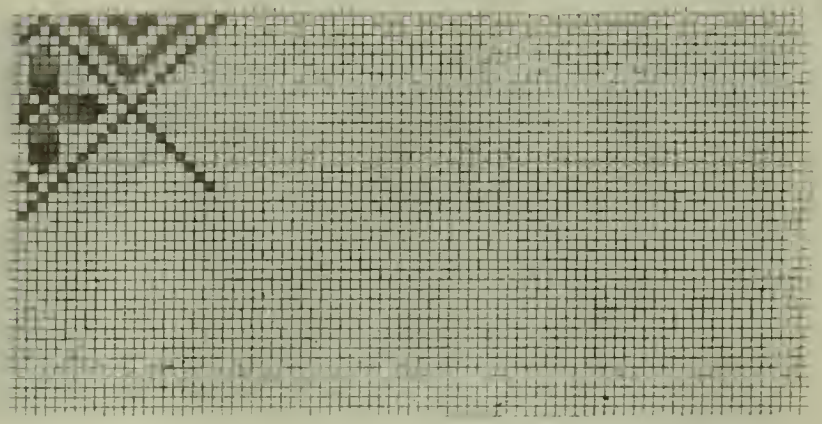
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 48

SHAFTS PICKS TO THE ROUND.

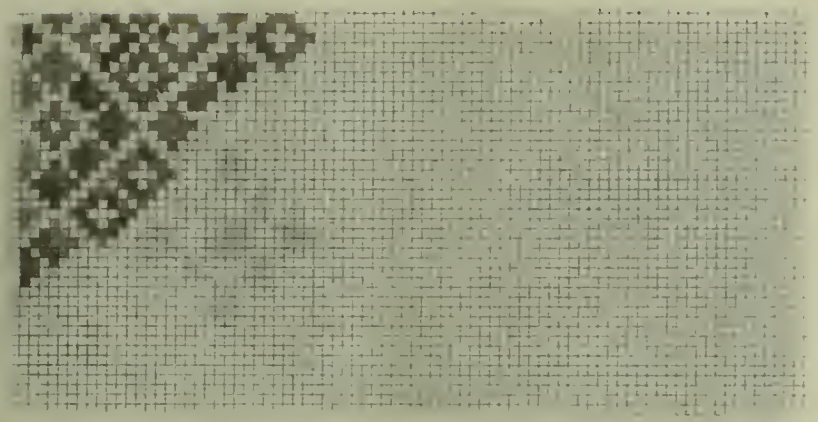
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 49

SHAFTS PICKS TO THE ROUND

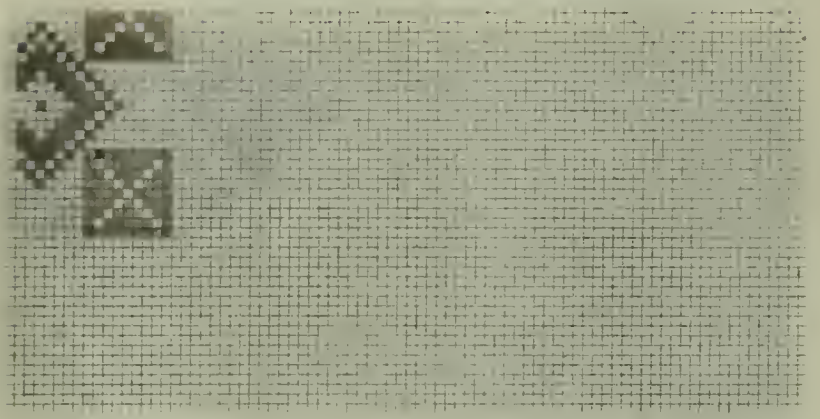
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 50

SHAFTS PICKS TO THE ROUND.

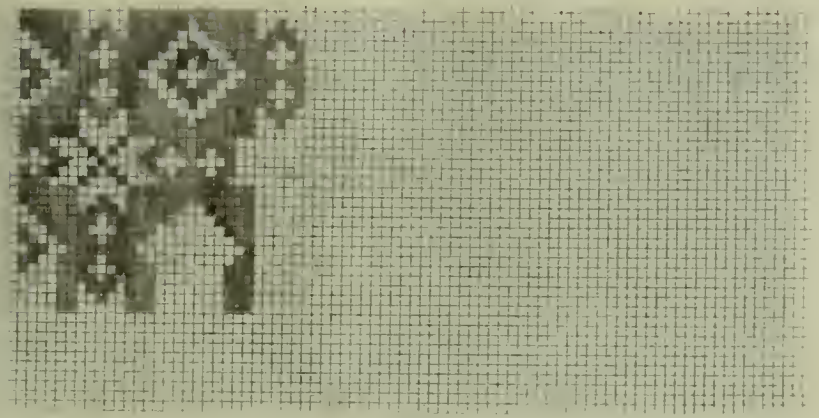
BLACK. WEFT. WHITE. WARP.



DESIGN Nº 51

SHAFTS PICKS TO THE ROUND

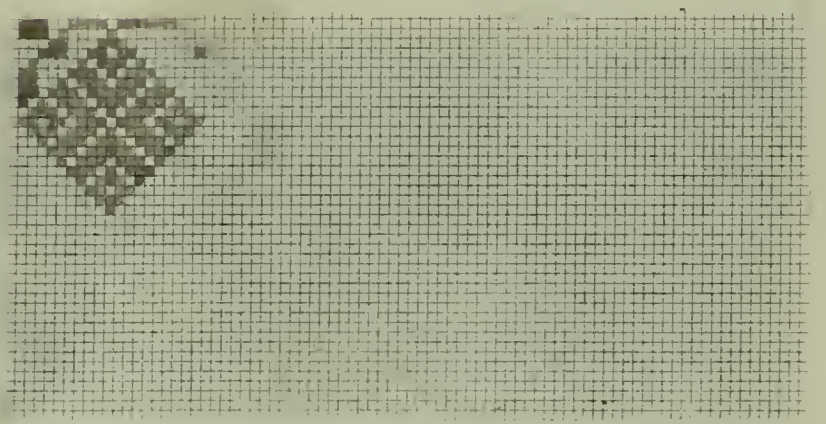
BLACK. WEFT. WHITE. WARP.



DESIGN Nº 52

SHAFTS PICKS TO THE ROUND.

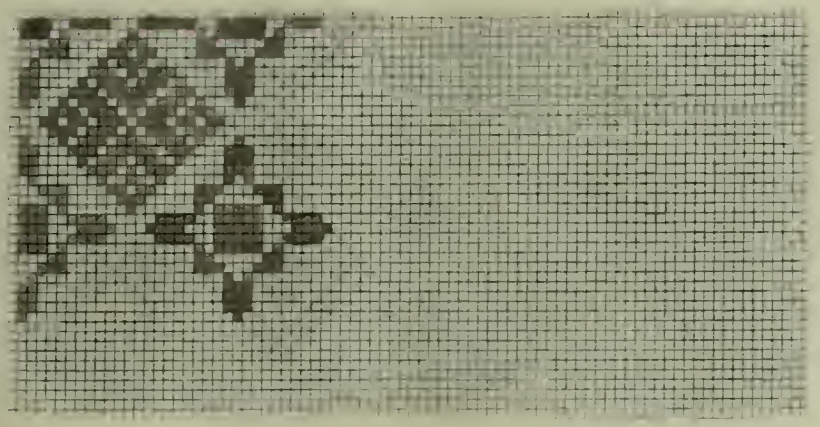
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 53

12 SHAFTS PICKS TO THE ROUND.

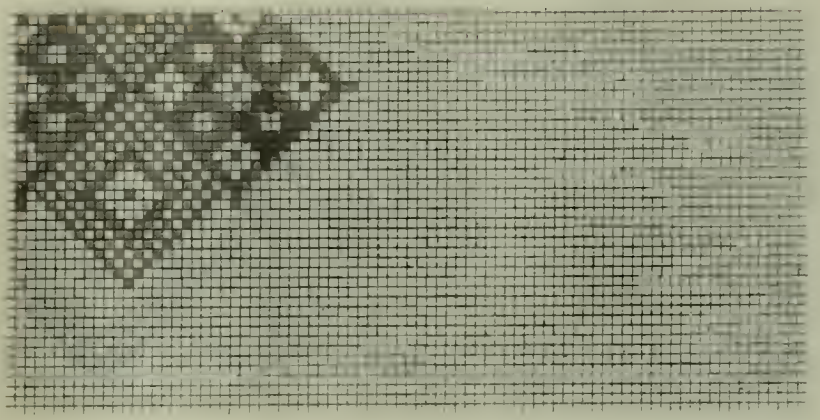
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 54

SHAFTS PICKS TO THE ROUND.

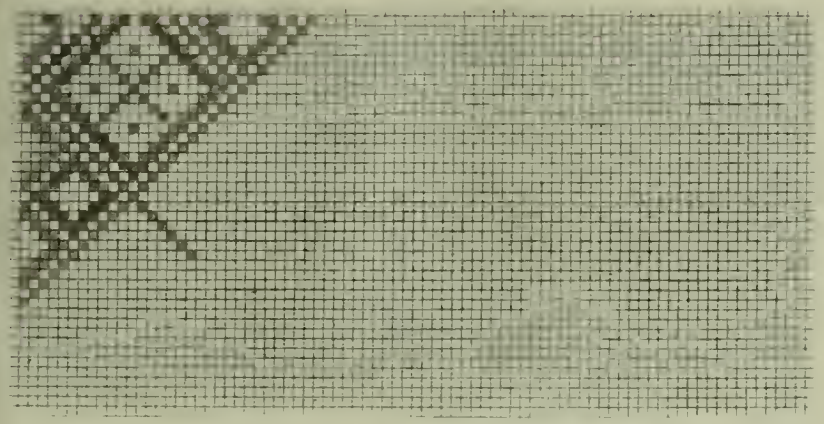
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 55

SHAFTS PICKS TO THE ROUND.

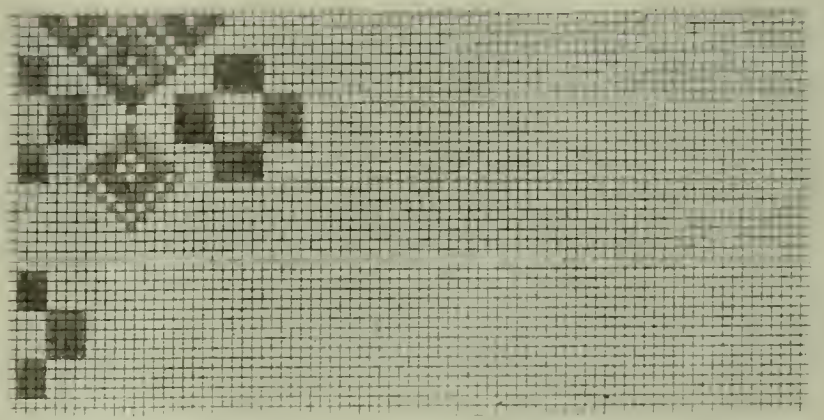
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 56

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No 57

SHAFTS 8 PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN No 58

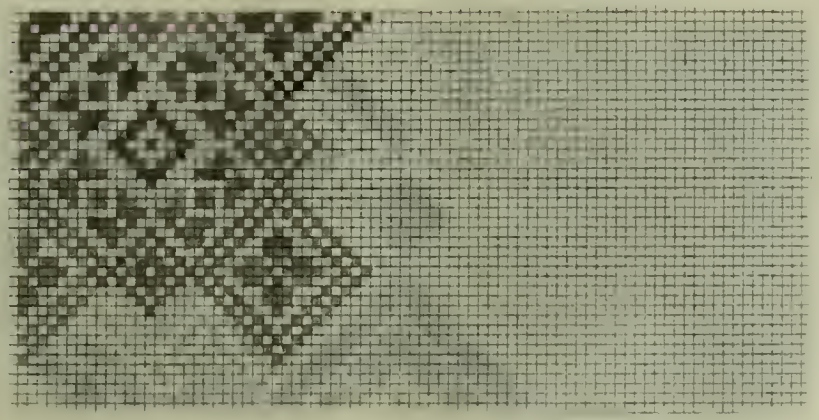
SHAFTS 8 PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP

DESIGN Nº 57

SHAFTS PICKS TO THE ROUND.

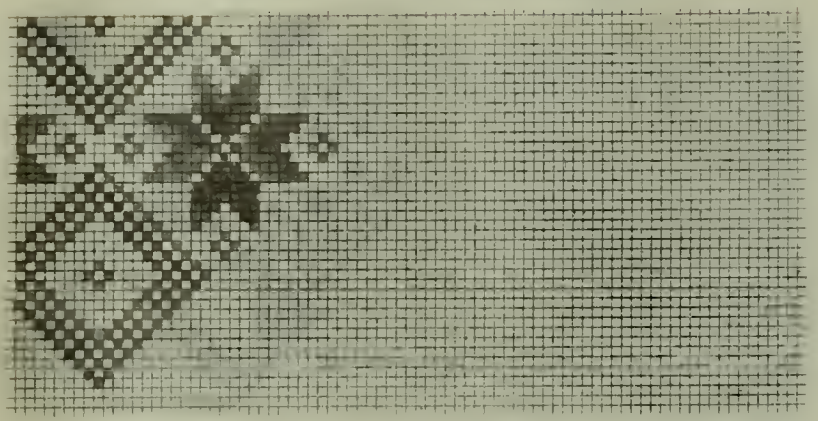
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 58

SHAFTS PICKS TO THE ROUND.

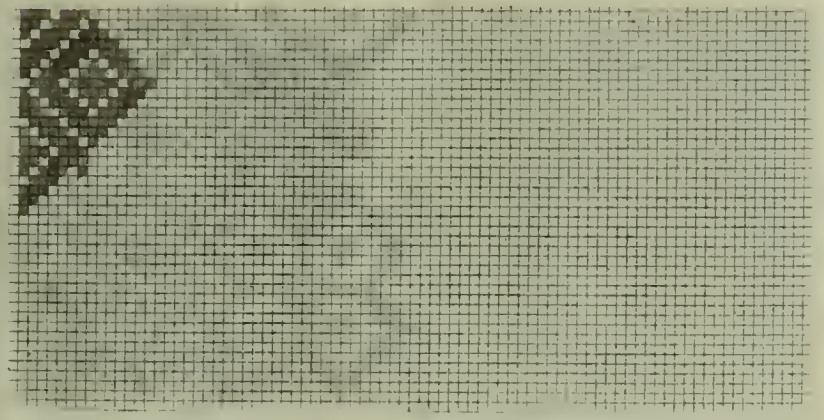
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 59

SHAFTS PICKS TO THE ROUND.

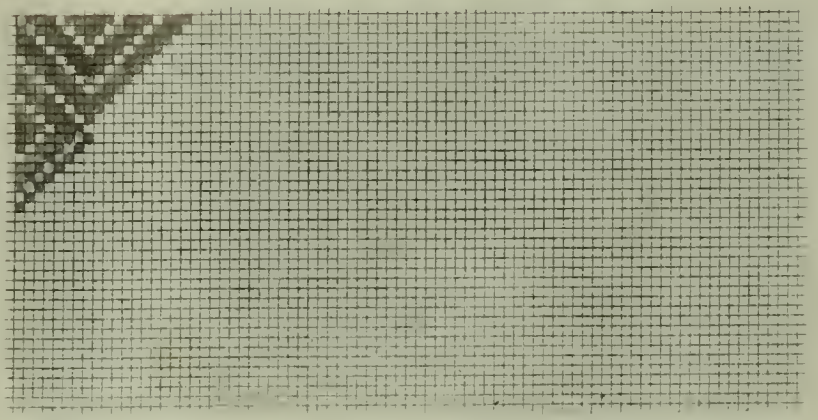
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 60

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No 75

SHAFTS PICKS TO THE ROUND

BLACK. WEFT. WHITE. WARP.

DESIGN No 76

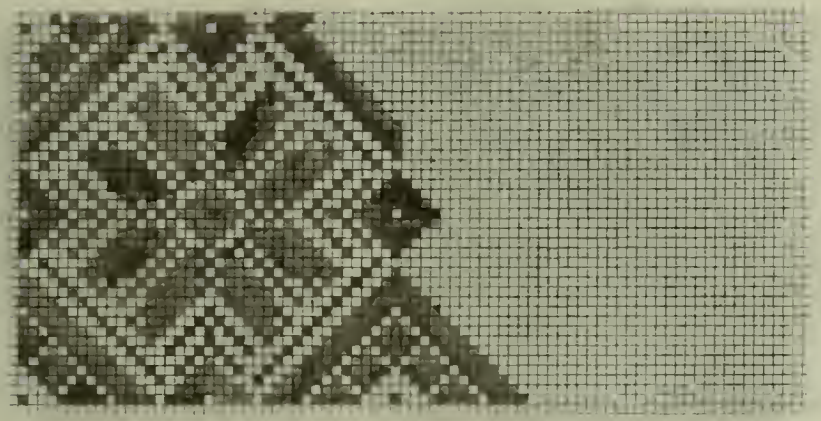
SHAFTS PICKS TO THE ROUND

BLACK WEFT WHITE WARP

DESIGN Nº 61

SHAFTS PICKS TO THE ROUND.

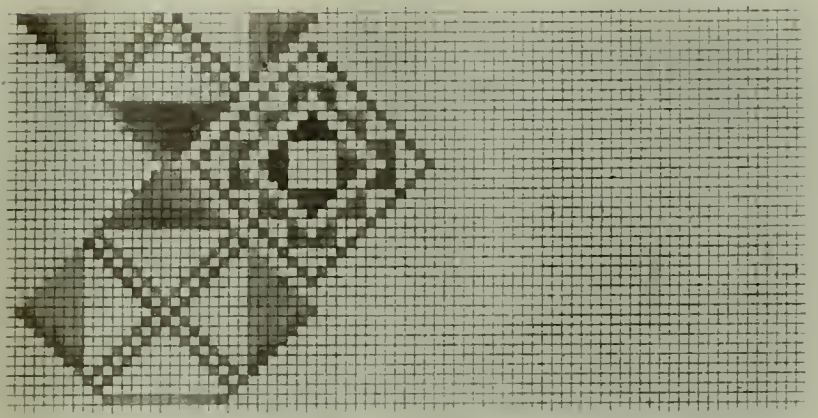
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 62

SHAFTS PICKS TO THE ROUND.

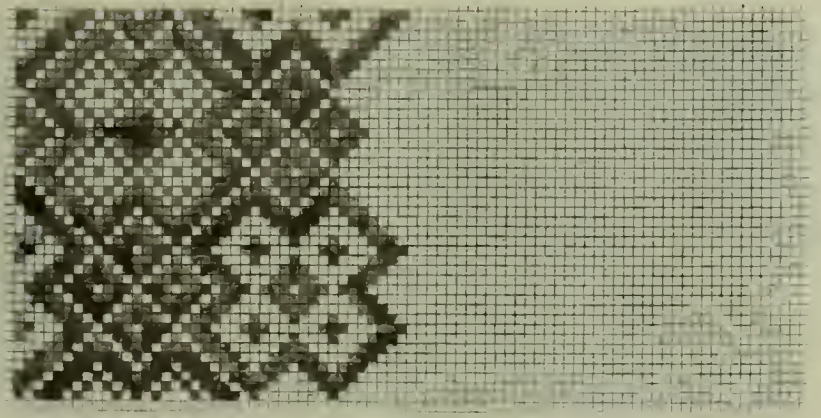
BLACK. WEFT. WHITE, WARP.



DESIGN Nº 63

SHAFTS PICKS TO THE ROUND.

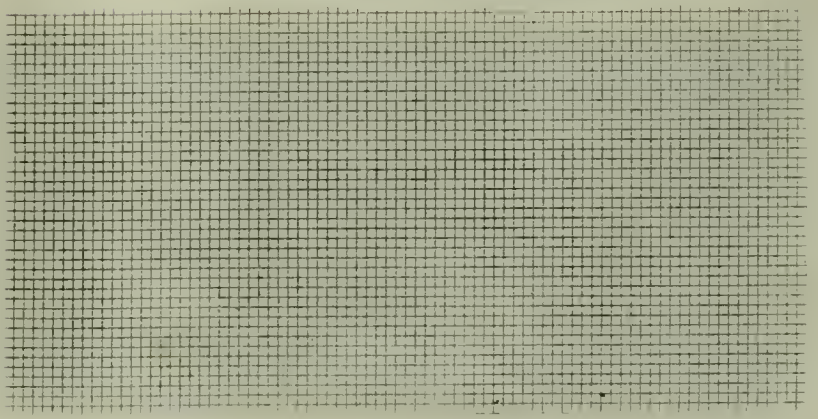
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 64

SHAFTS PICKS TO THE ROUND.

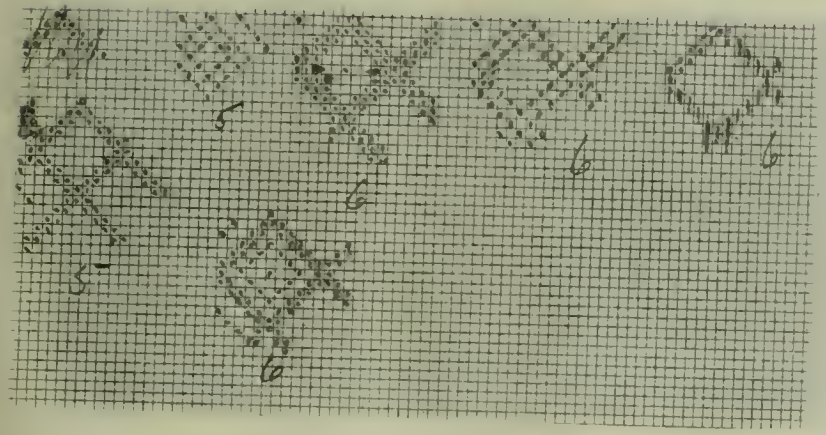
BLACK, WEFT. WHITE, WARP.



DESIGN No 69

SHAFTS PICKS TO THE ROUND

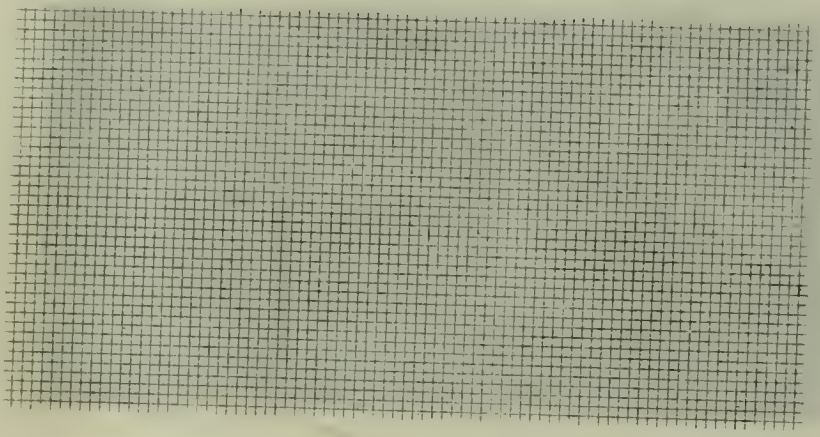
BLACK, WEFT. WHITE, WARP.



DESIGN No 70

SHAFTS PICKS TO THE ROUND

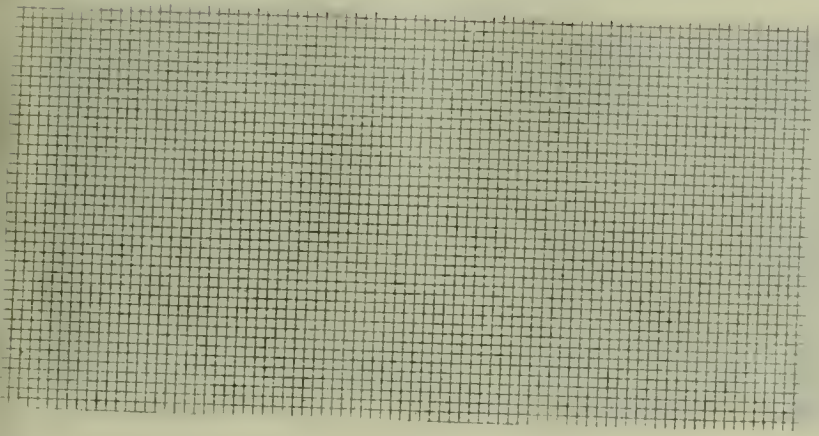
BLACK, WEFT. WHITE, WARP.



DESIGN No 71

SHAFTS PICKS TO THE ROUND

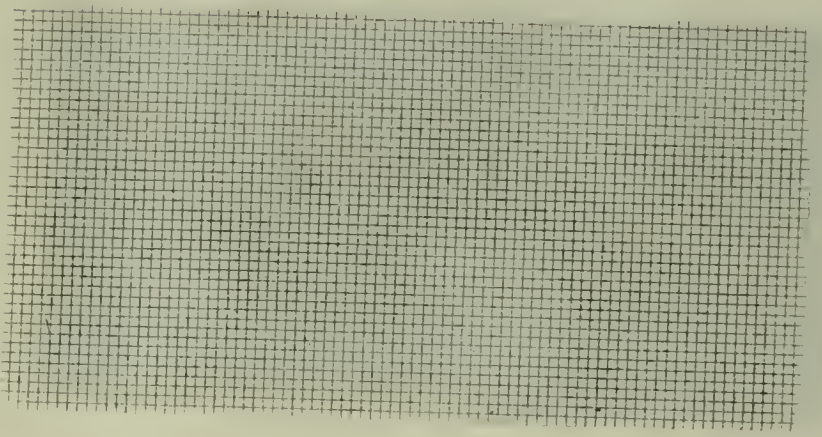
BLACK, WEFT. WHITE, WARP.



DESIGN No 72

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



DESIGN No. 2

SHAFTS 2 PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN No. 3

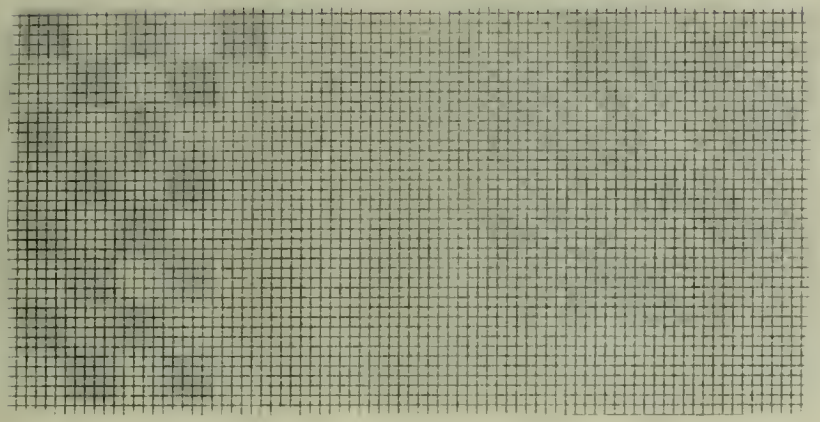
SHAFTS 3 PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN Nº 73

SHAFTS PICKS TO THE ROUND.

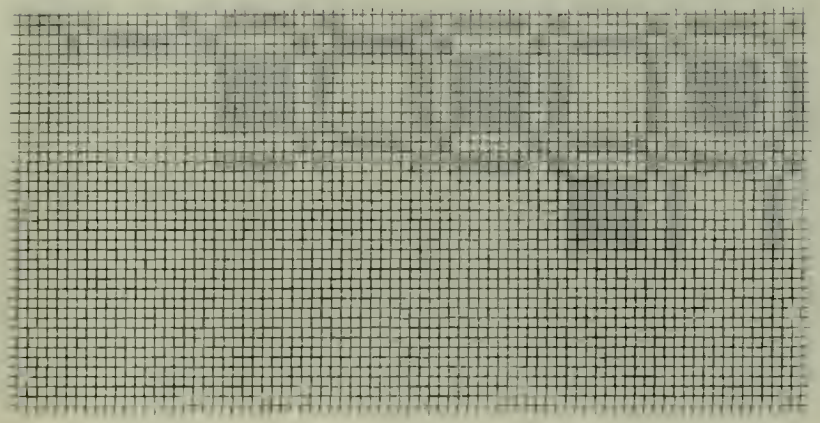
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 74

SHAFTS PICKS TO THE ROUND.

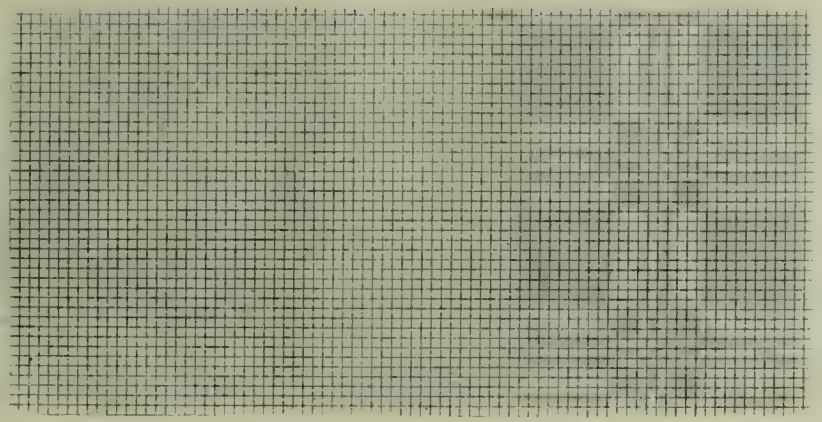
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 75

SHAFTS PICKS TO THE ROUND.

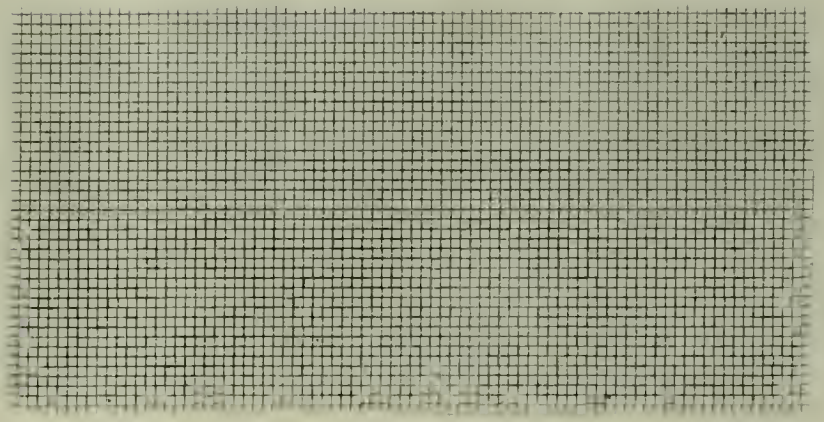
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 76

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN NO 74

SHAFTS 4 PICKS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN NO 75

SHAFTS 4 PICKS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN NO 76

SHAFTS 4 PICKS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN NO 77

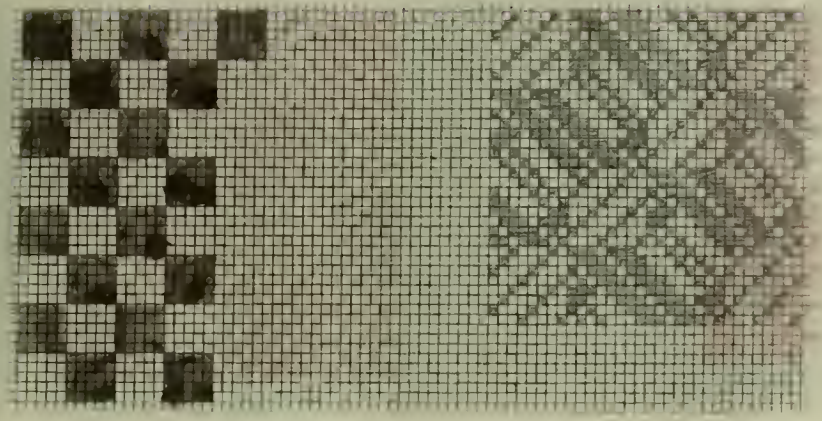
SHAFTS 4 PICKS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN Nº 77

SHAFTS PICKS TO THE ROUND.

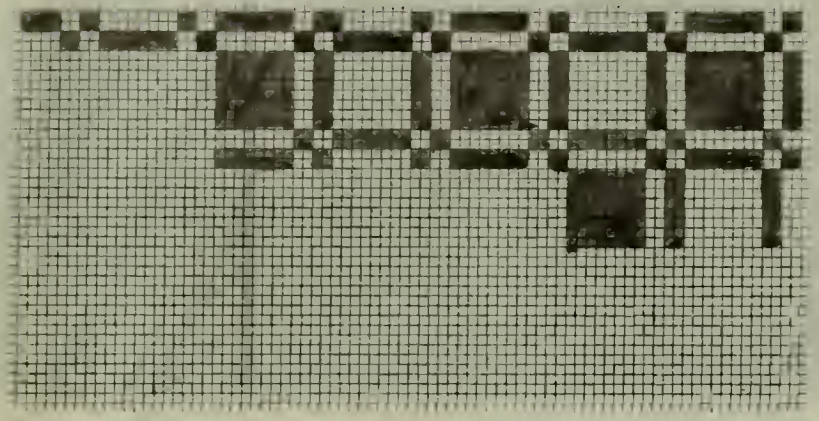
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 78

SHAFTS PICKS TO THE ROUND.

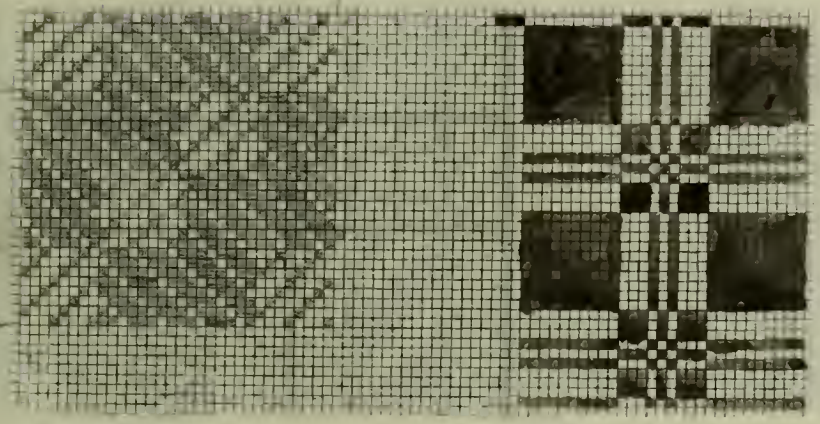
BLACK, WEFT. WHITE, WARP.



DESIGN Nº 79

SHAFTS PICKS TO THE ROUND.

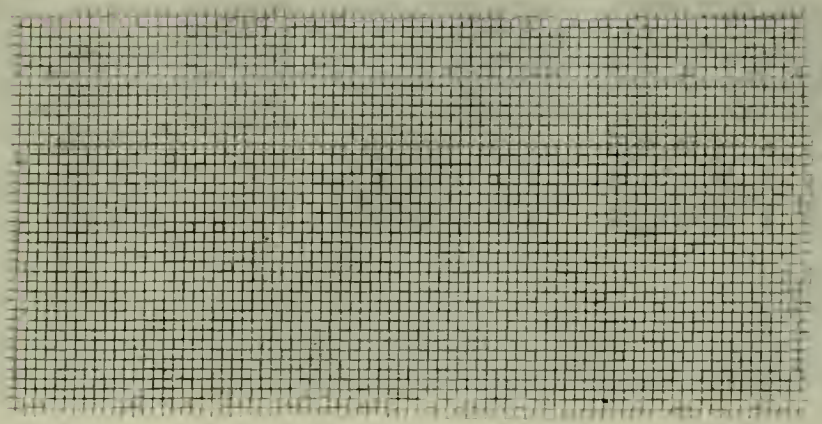
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No. 75

SHAFTS — BLOCK TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN No. 77

SHAFTS — BLOCK TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN No.

SHAFTS — BLOCK TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN No.

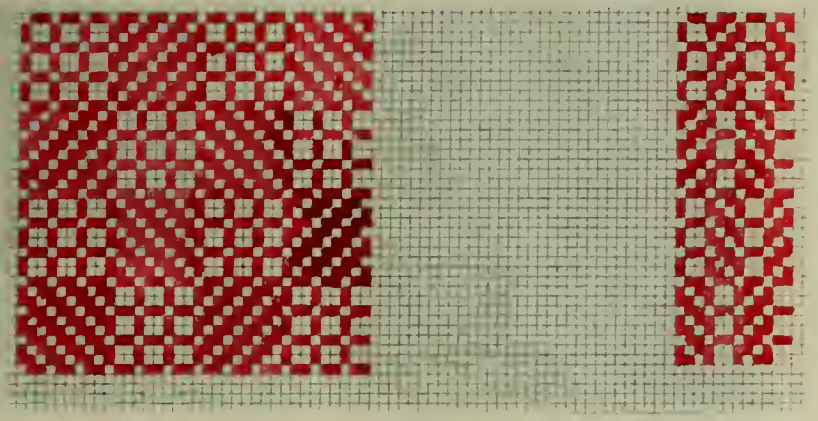
SHAFTS — BLOCK TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND

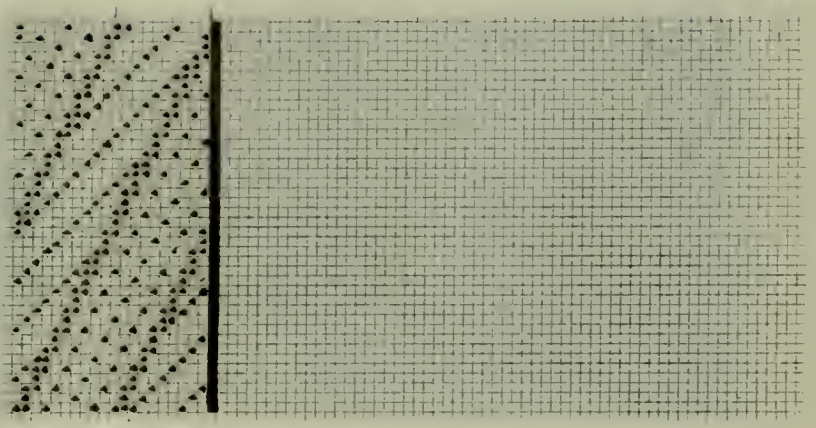
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

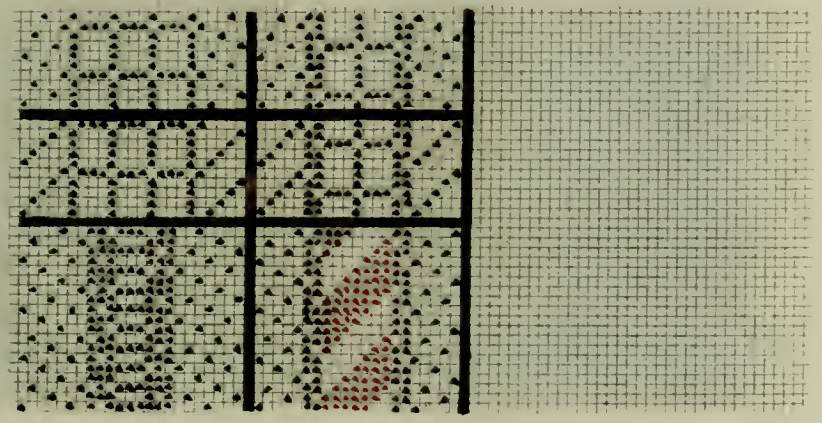
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

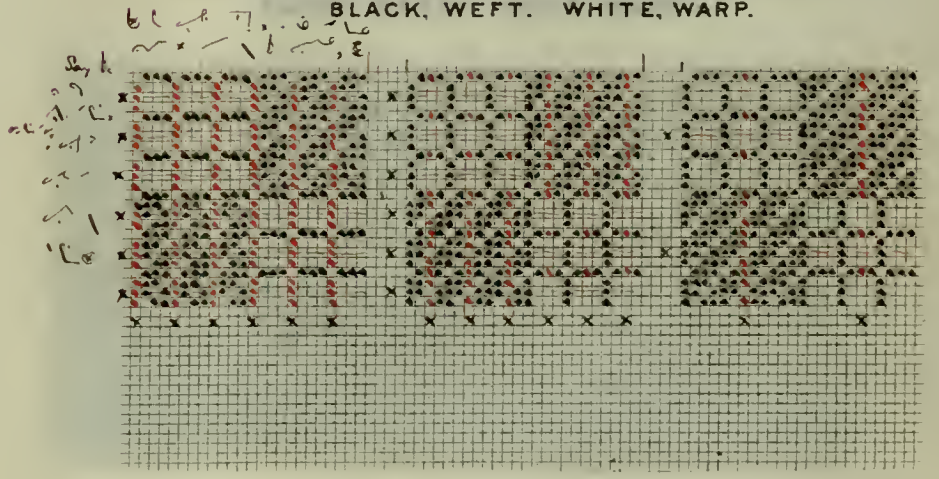
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

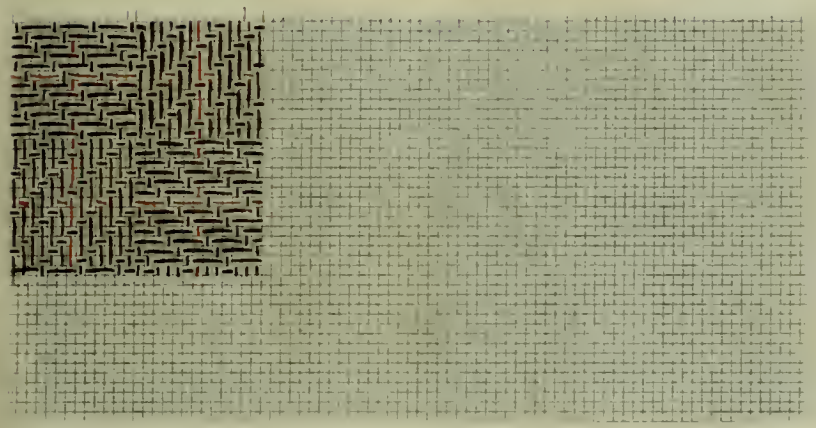
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

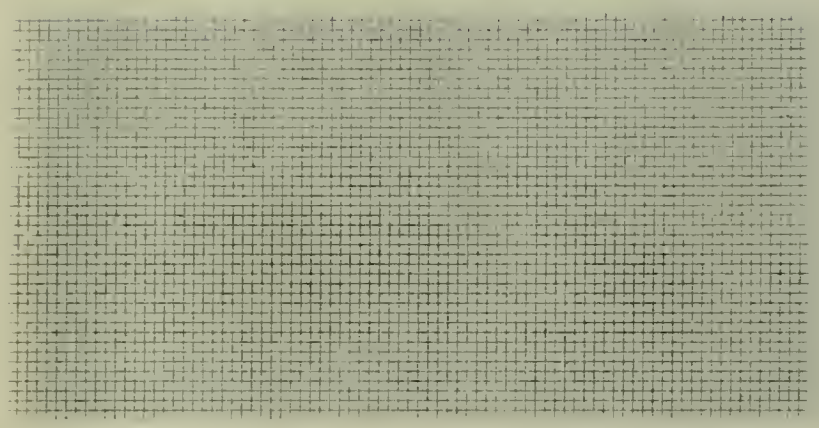
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

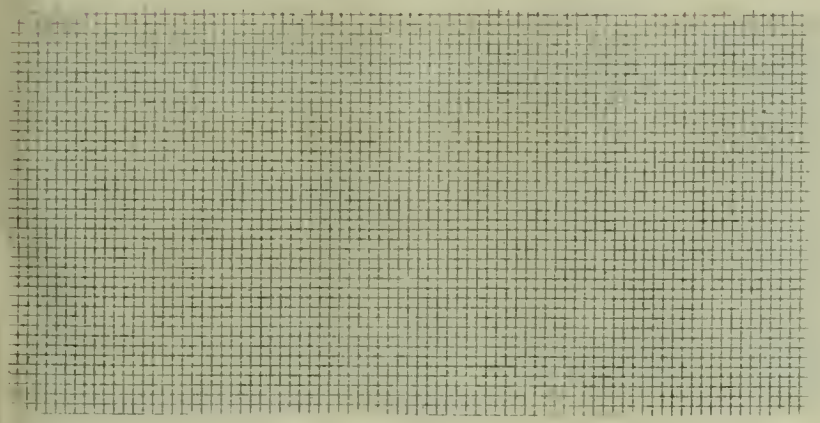
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

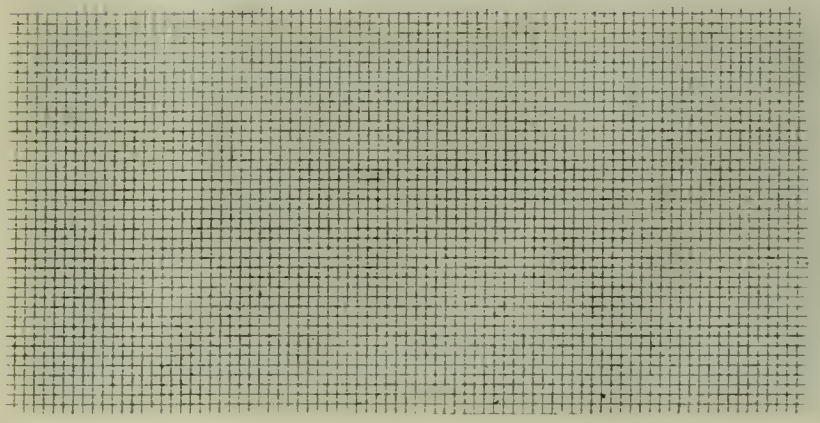
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK WEFT WHITE WARP

DESIGN No

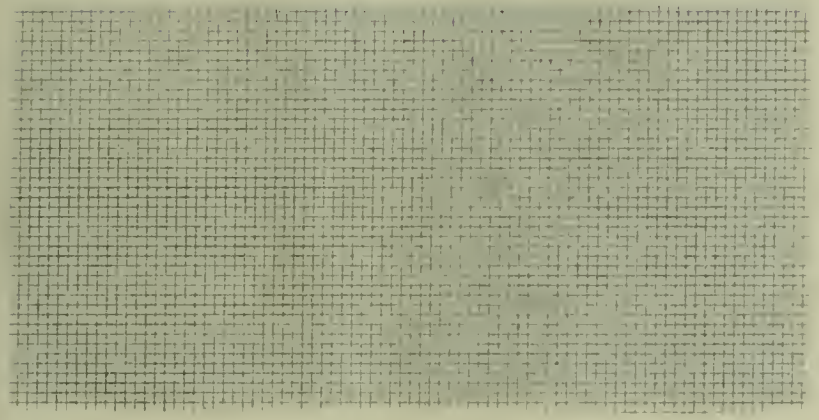
SHAFTS PICKS TO THE ROUND

BLACK WEFT WHITE WARP

DESIGN Nº

SHAFTS PICKS TO THE ROUND

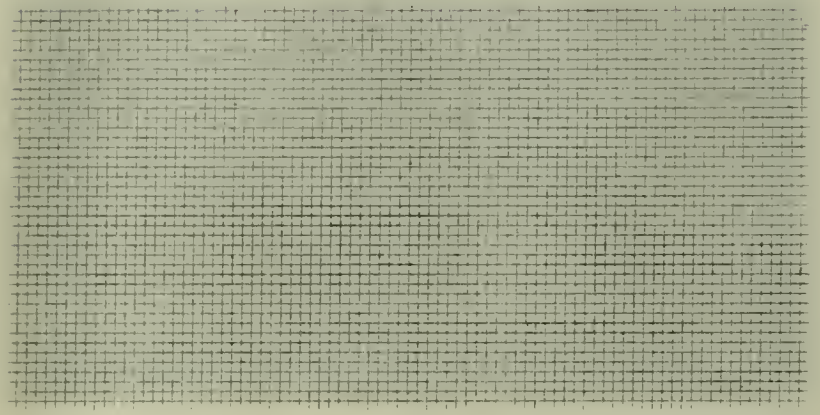
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

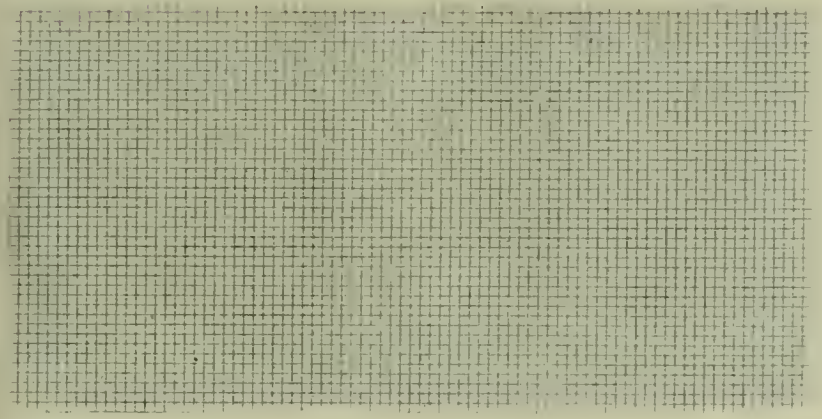
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

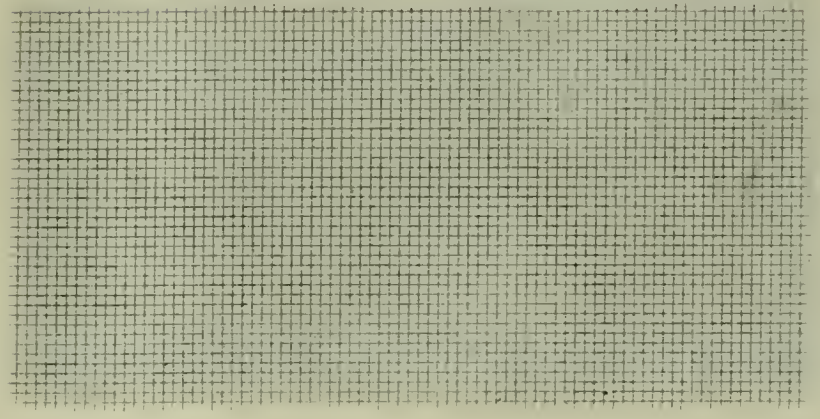
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

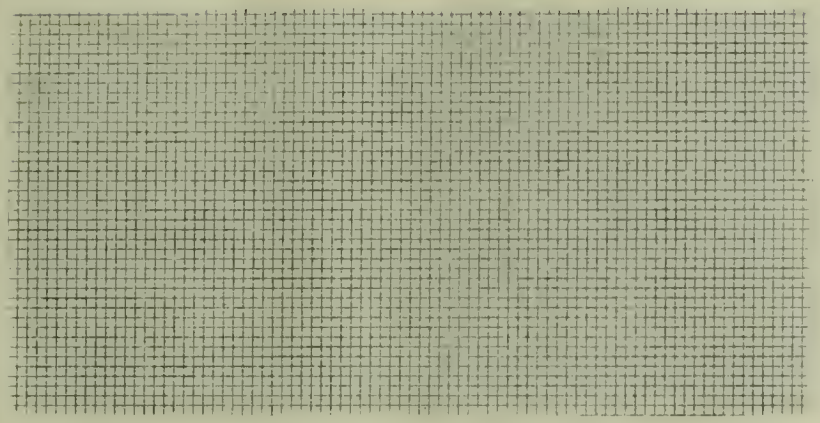
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

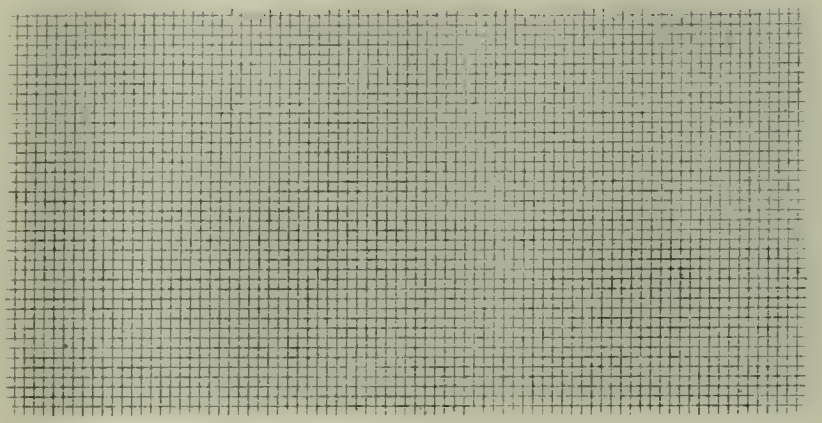
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

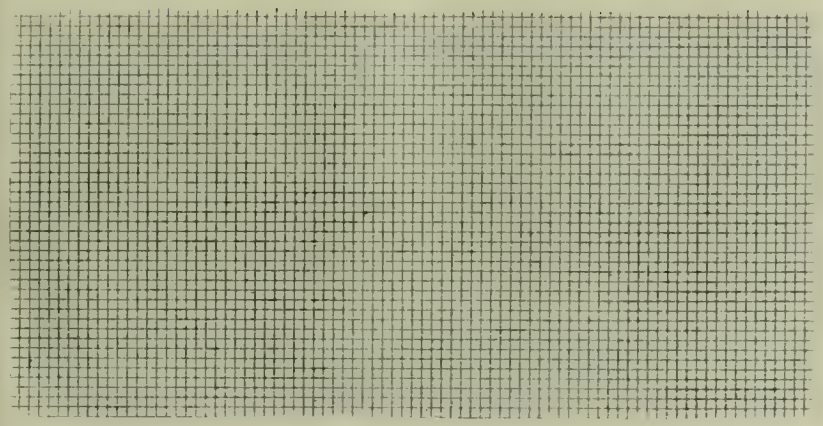
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

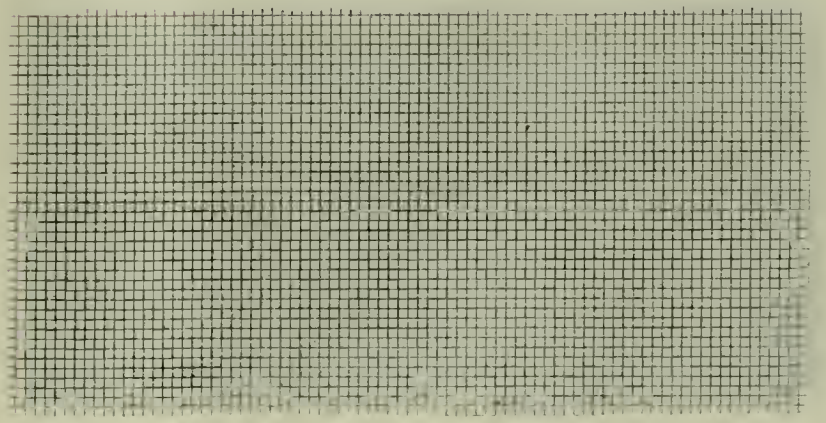
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

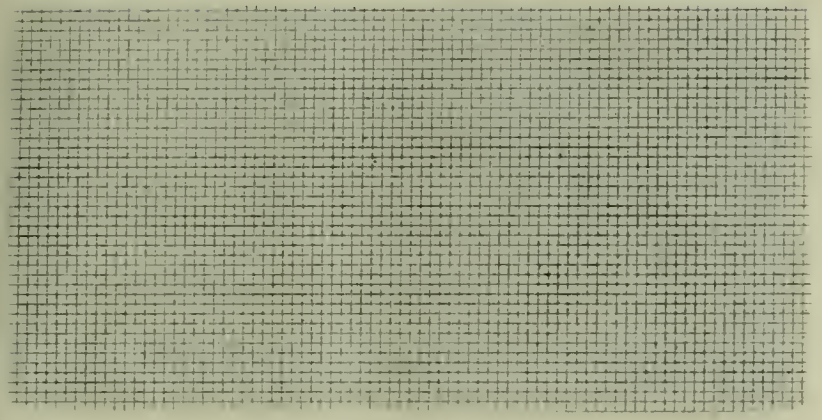
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

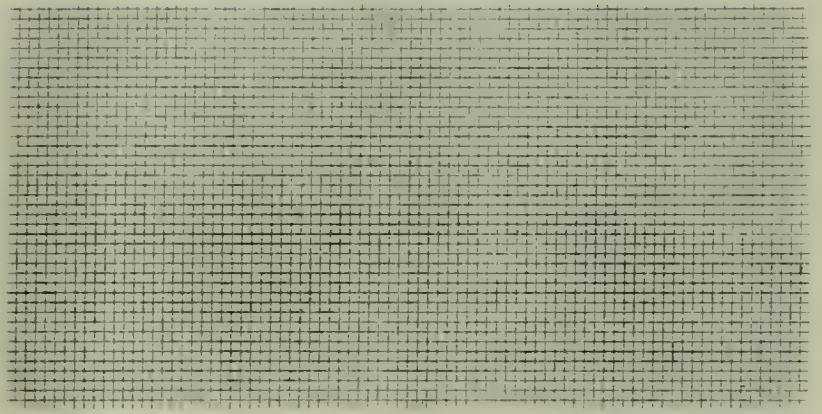
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

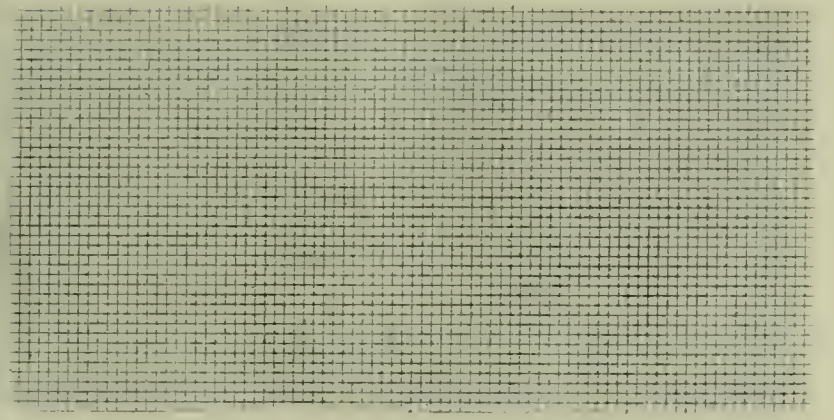
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

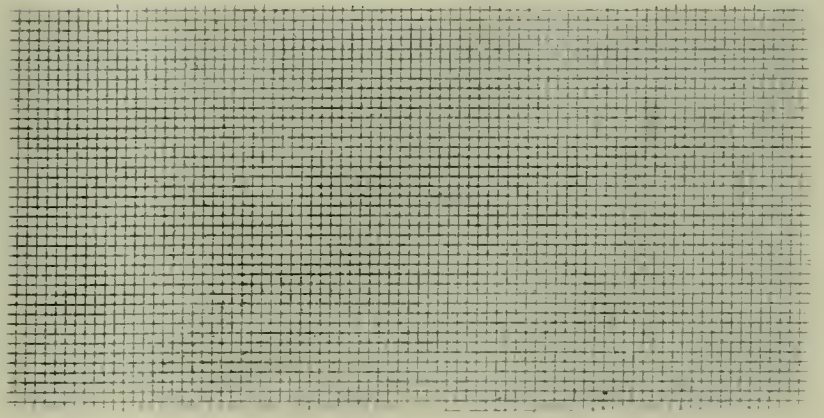
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

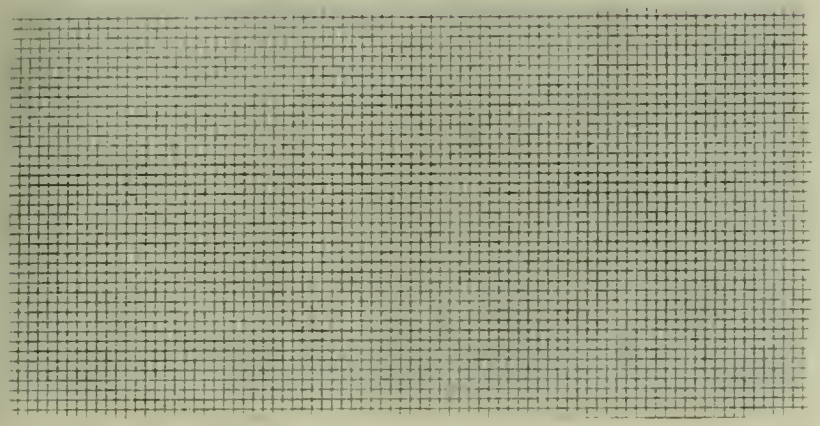
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

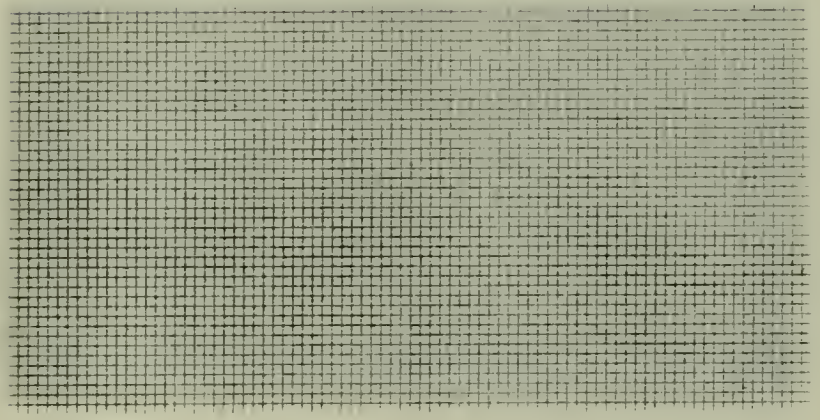
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

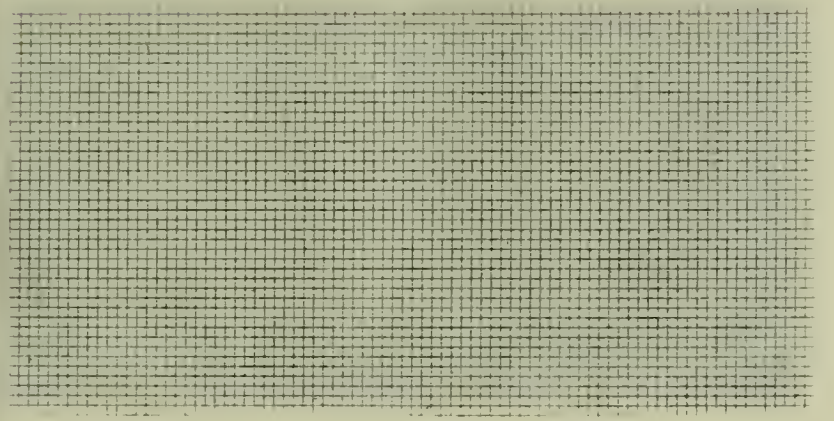
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

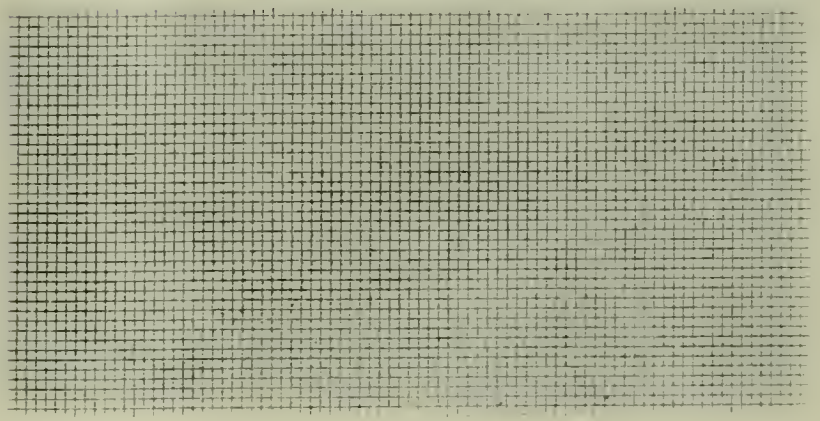
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

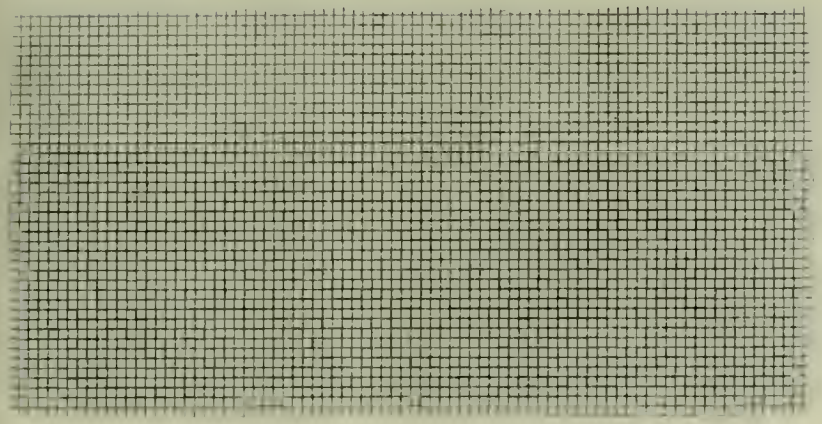
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

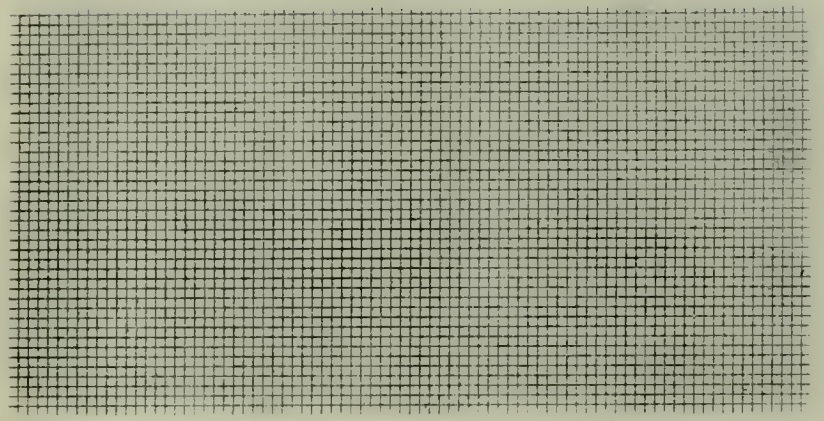
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

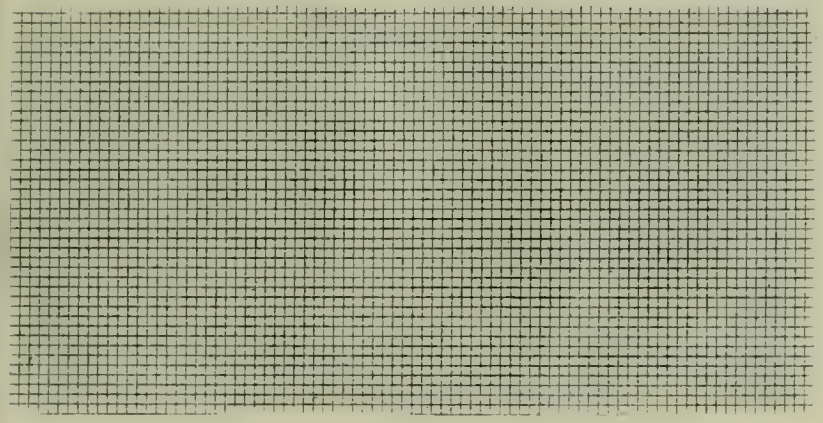
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

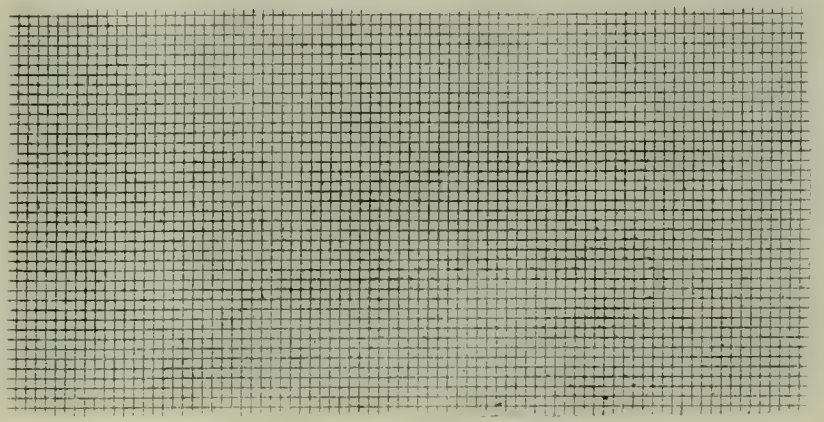
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN No

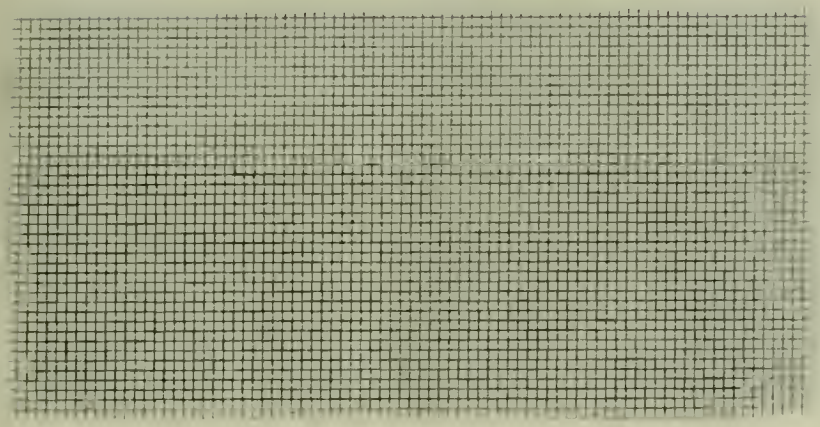
SHAFTS PICKS TO THE ROUND

BLACK WEFT WHITE WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

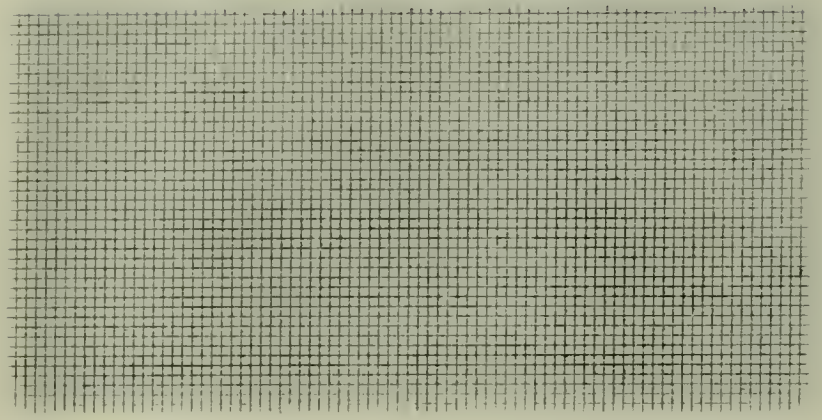
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

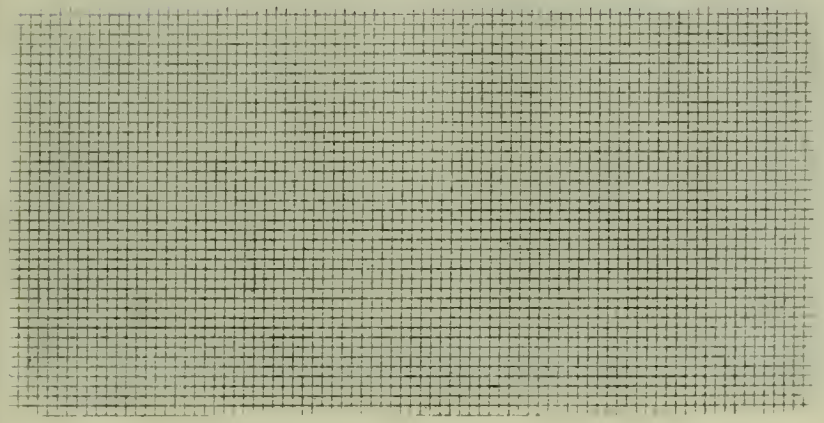
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

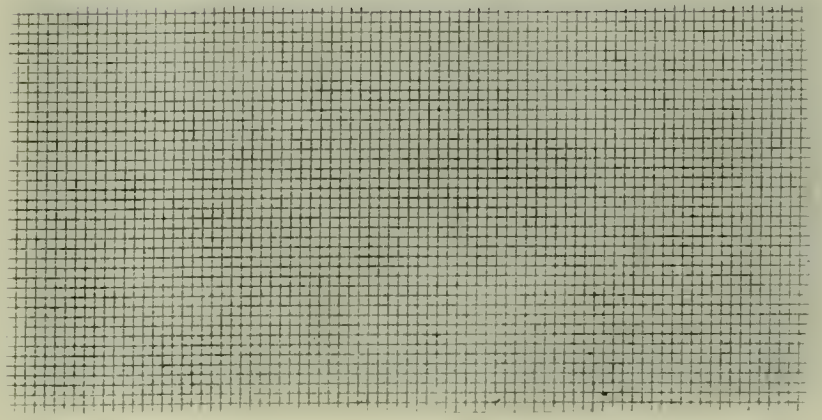
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT WHITE, WARP

DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT WHITE, WARP

DESIGN No

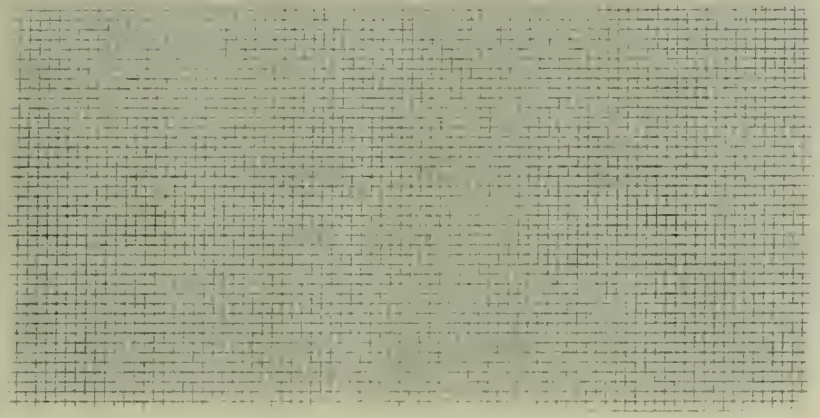
SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

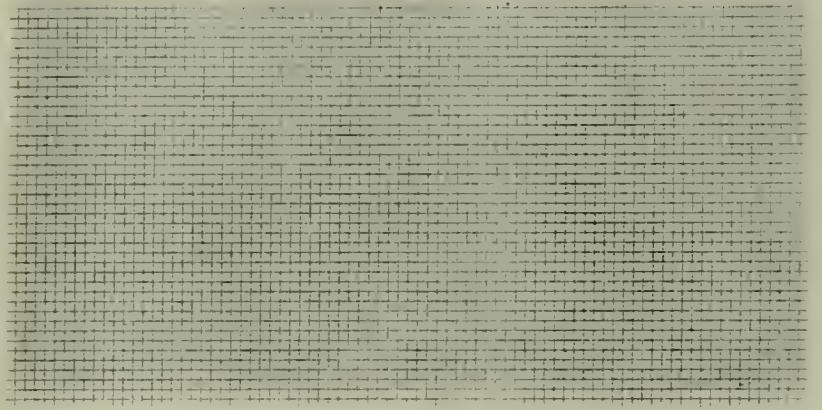
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

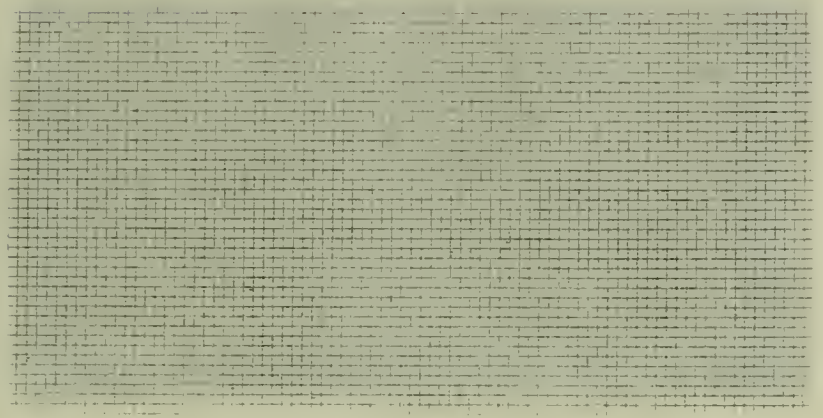
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

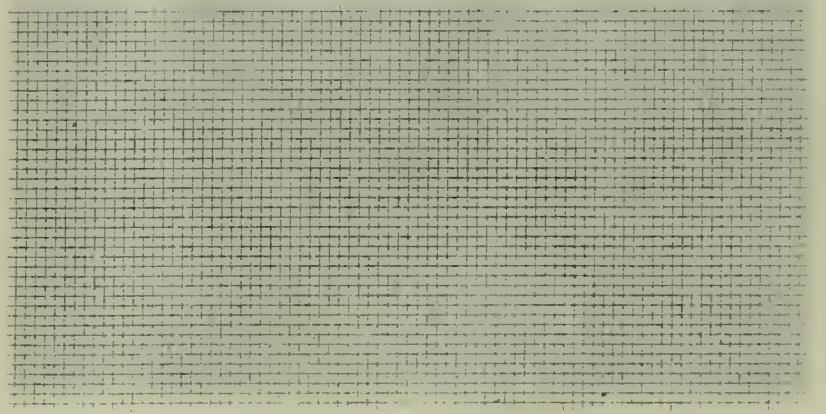
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

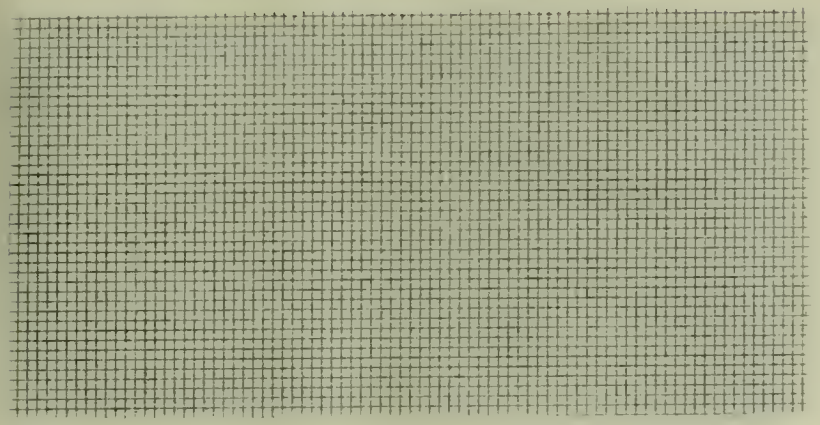
BLACK. WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

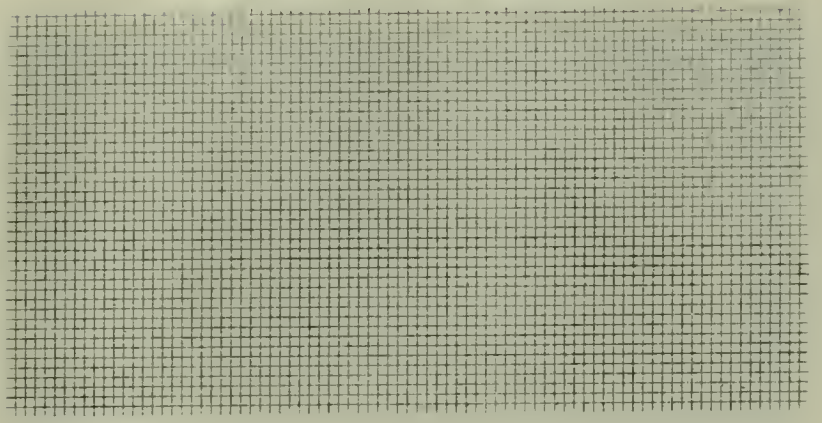
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

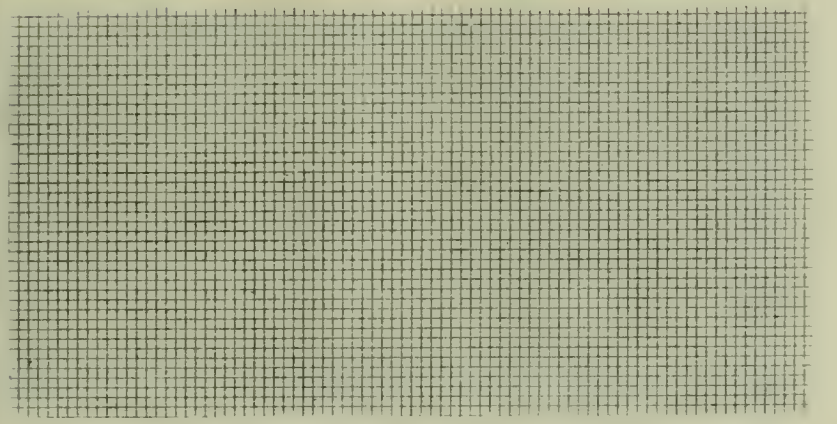
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

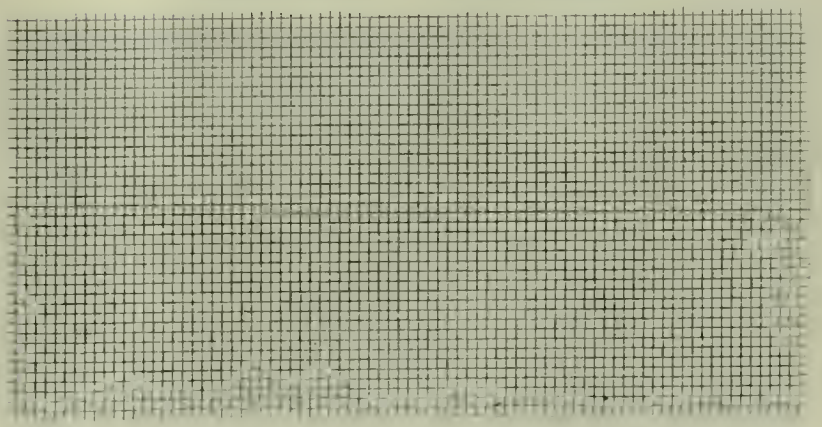
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

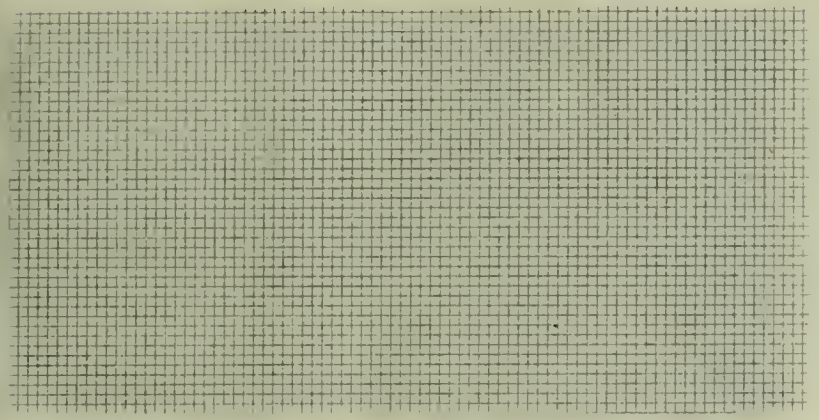
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

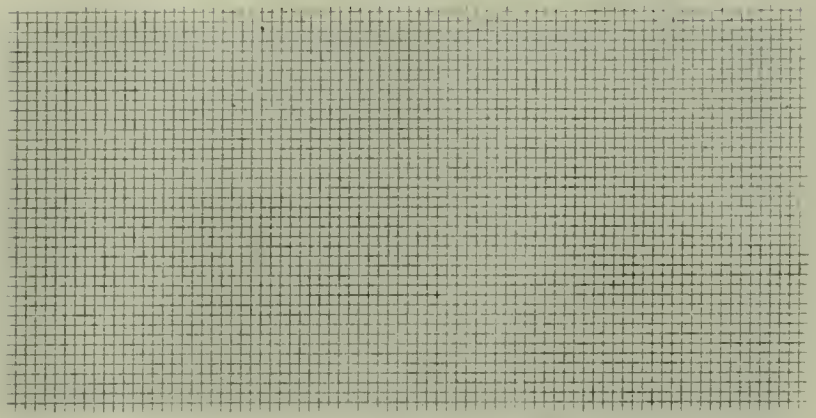
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

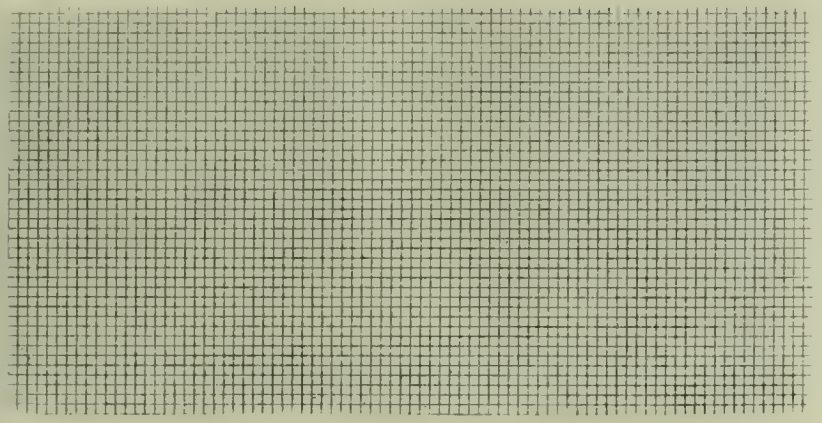
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN Nº

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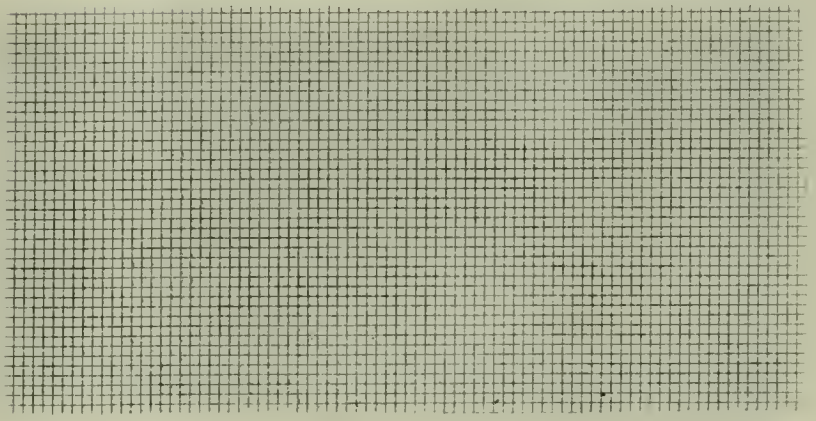
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

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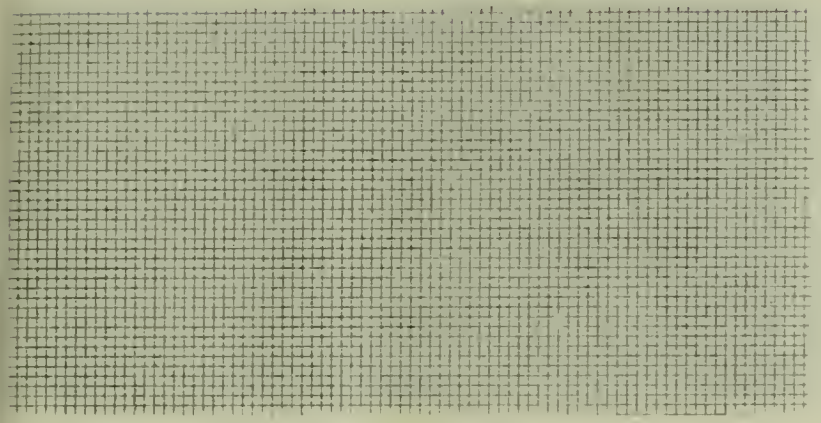
BLACK, WEFT. WHITE, WARP.



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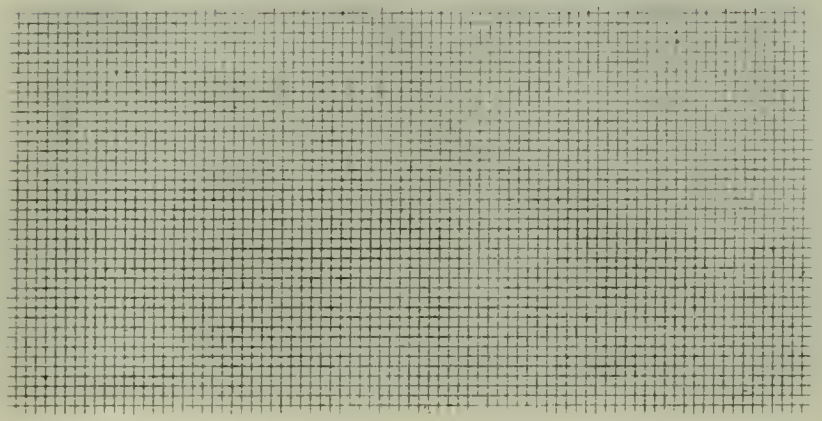

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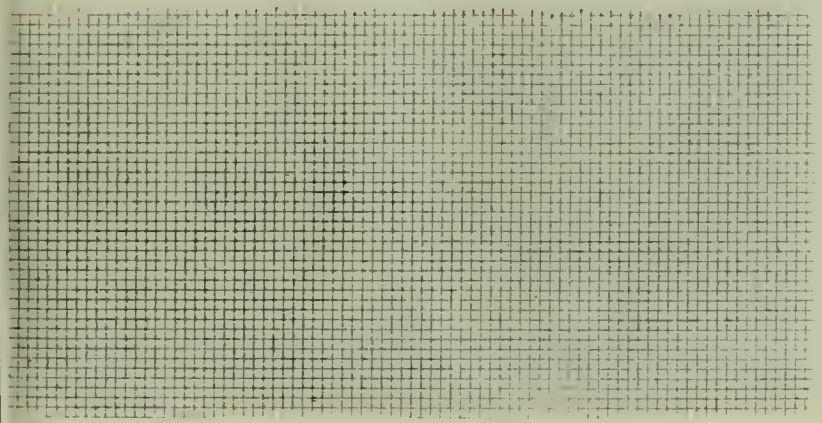
BLACK, WEFT. WHITE, WARP.



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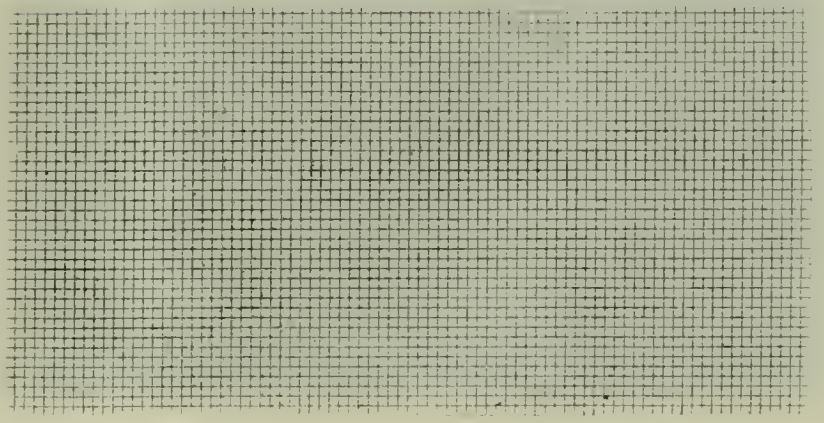
BLACK, WEFT. WHITE, WARP.



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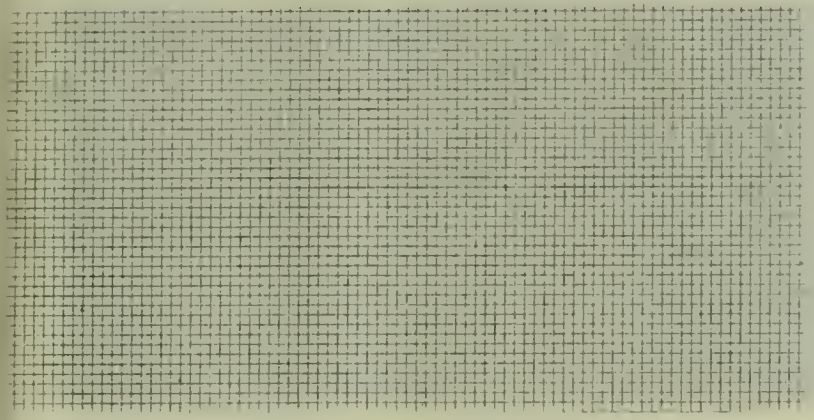
BLACK, WEFT. WHITE, WARP.



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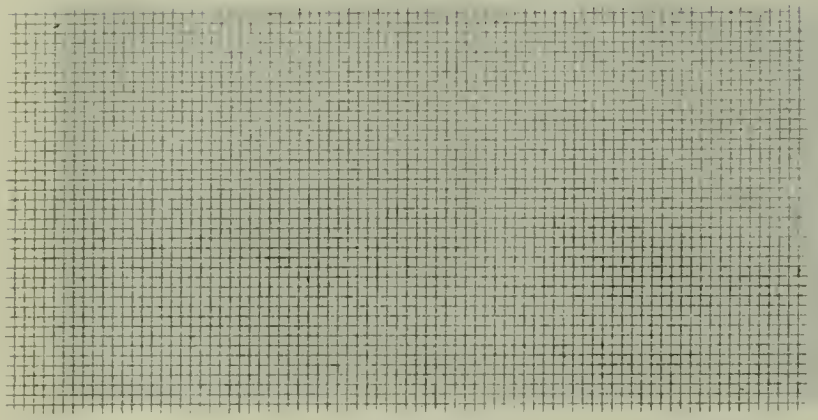
BLACK, WEFT. WHITE, WARP.



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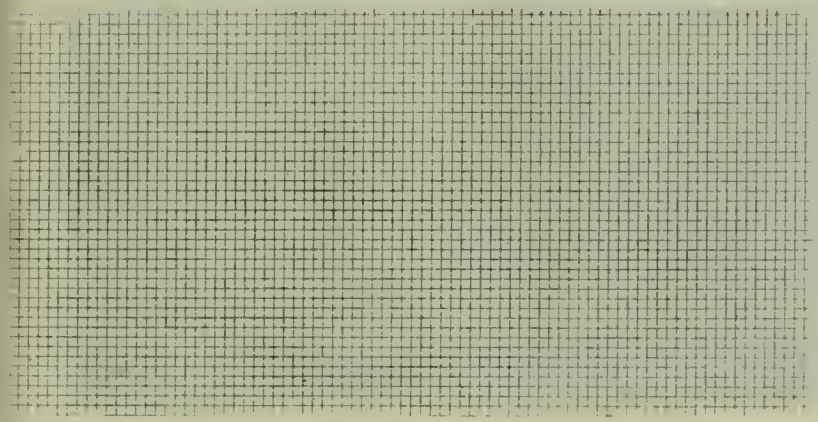

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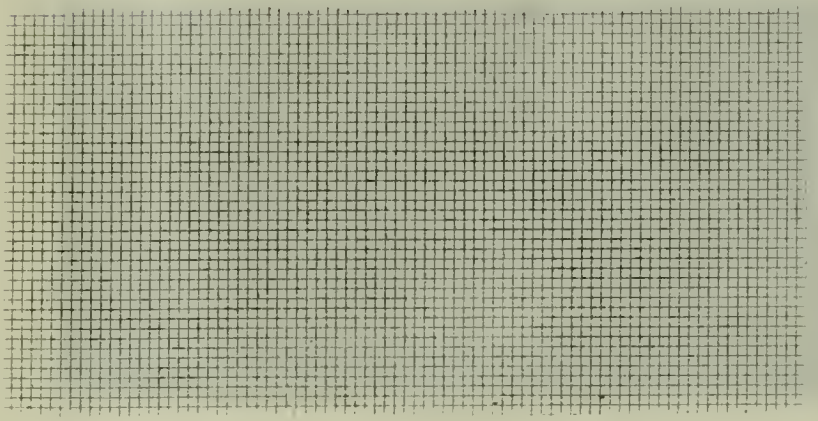

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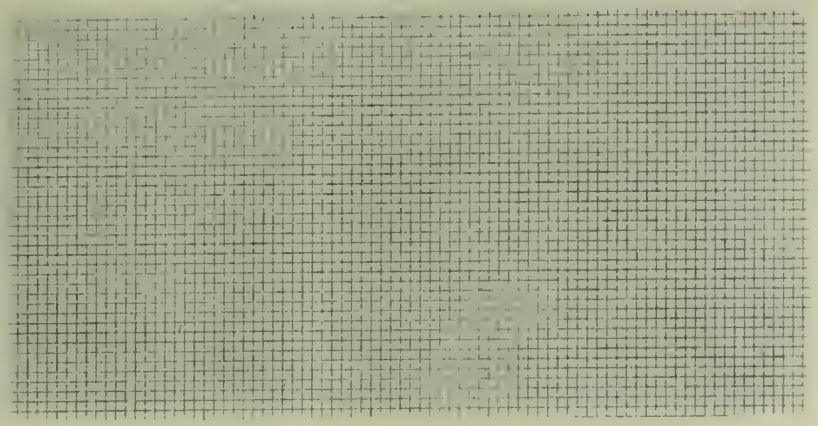
BLACK, WEFT. WHITE, WARP.



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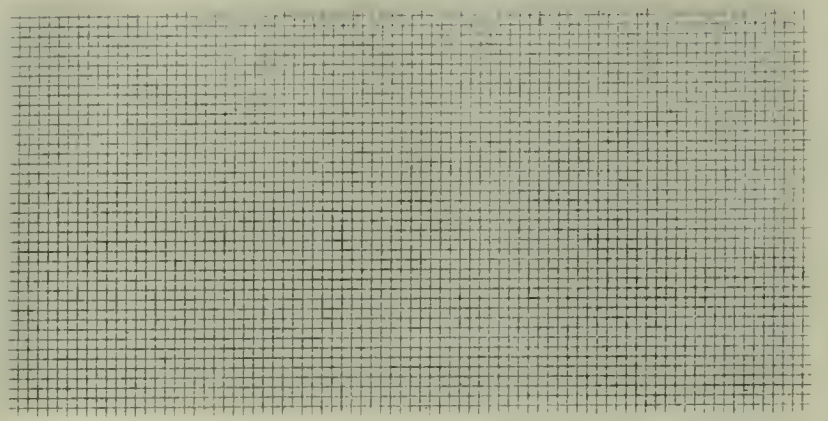

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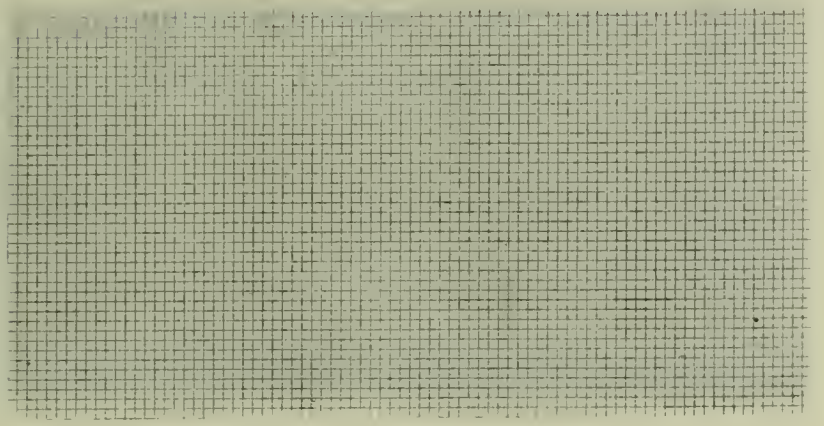

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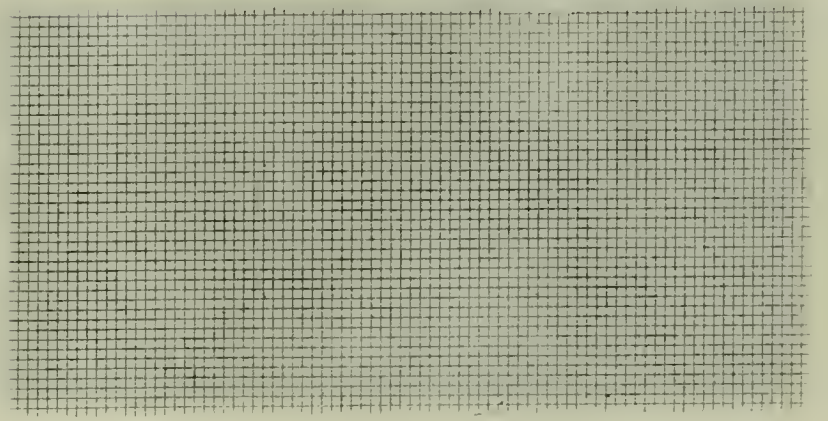

DESIGN No

SHAFTS ... RIDING TO THE ROUND

BLACK WEFT. WHITE WARP

DESIGN No

SHAFTS ... RIDING TO THE ROUND

BLACK WEFT. WHITE WARP

DESIGN Nº

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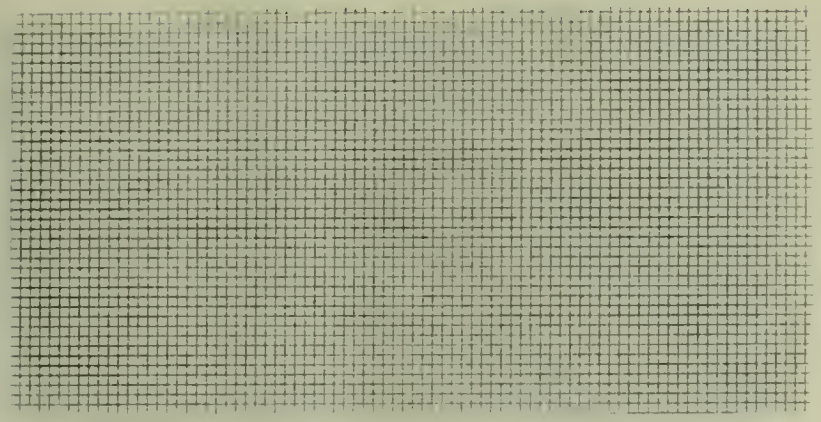
BLACK, WEFT. WHITE, WARP.



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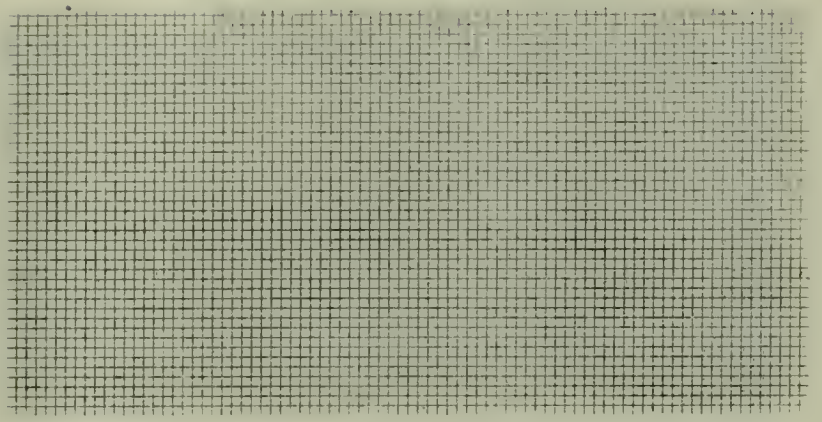
BLACK, WEFT. WHITE, WARP.



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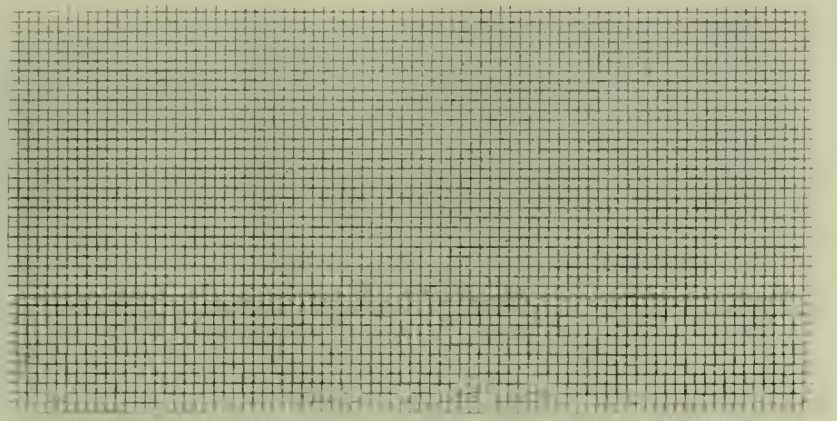

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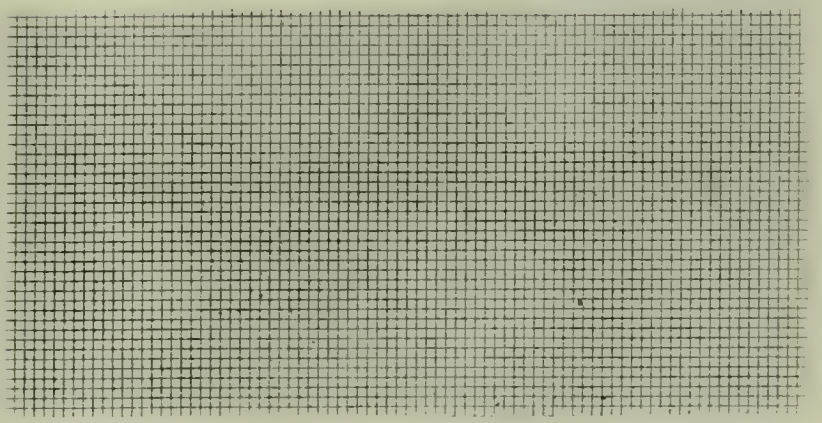

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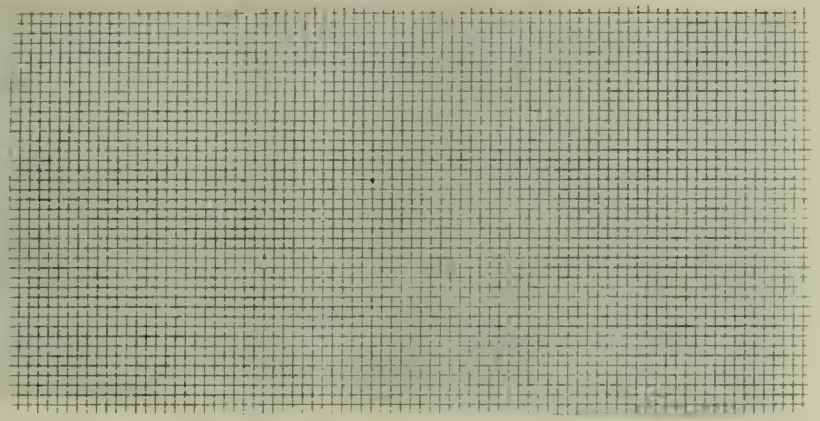
SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



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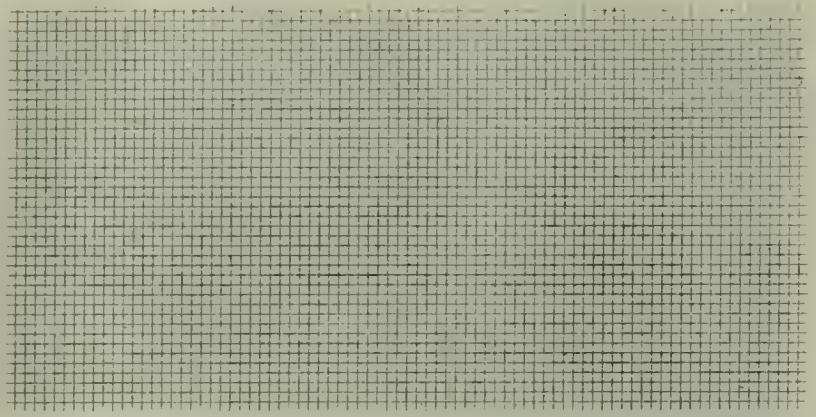
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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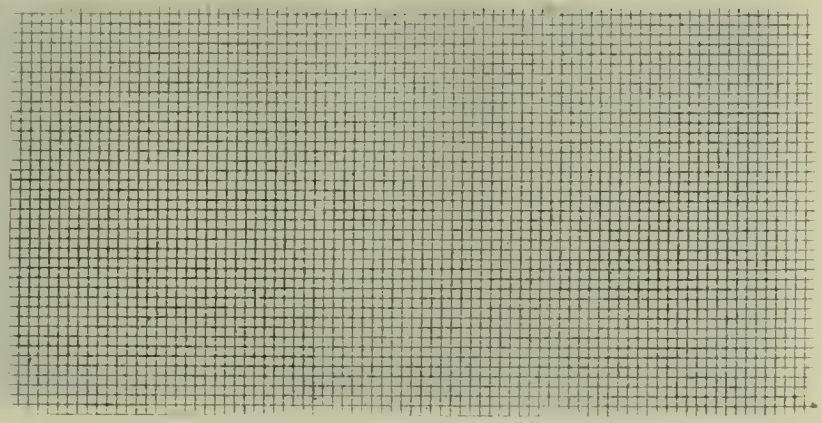
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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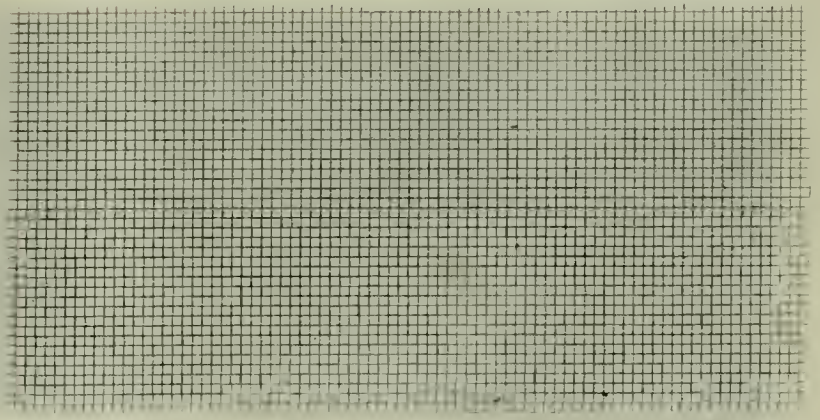

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SHAFTS PICKS TO THE ROUND

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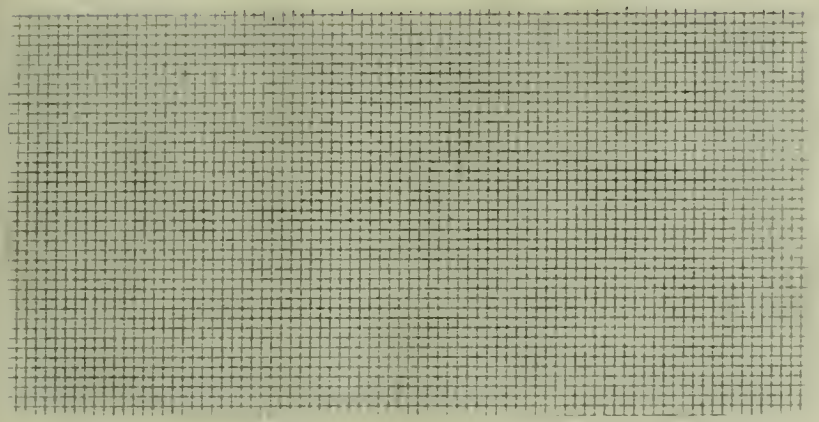

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SHAFTS PICKS TO THE ROUND

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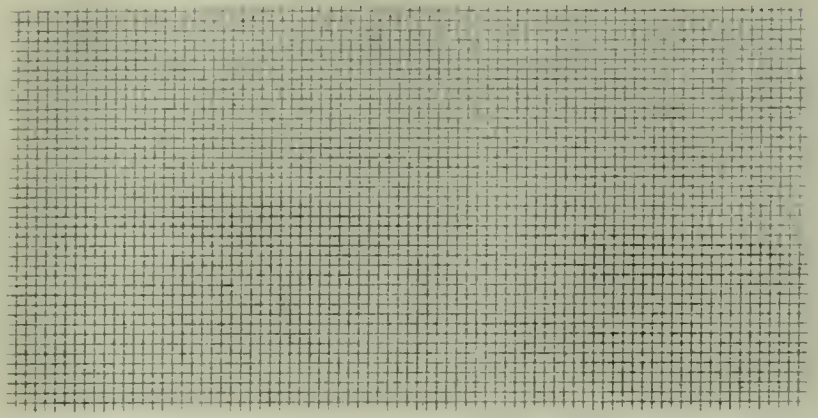

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SHAFTS PICKS TO THE ROUND

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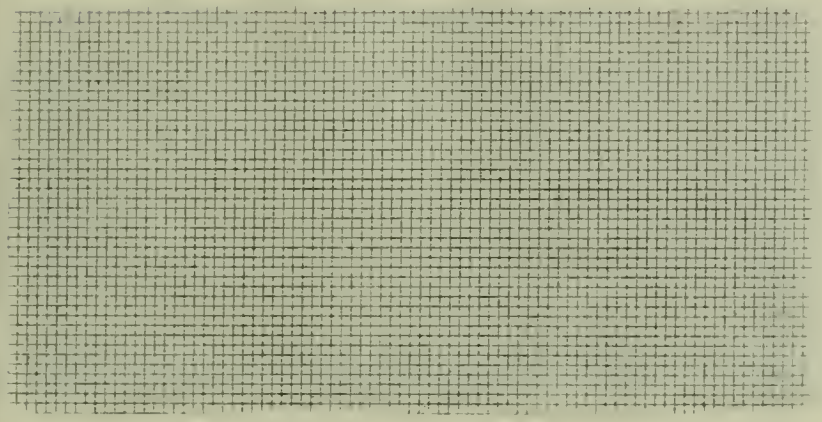

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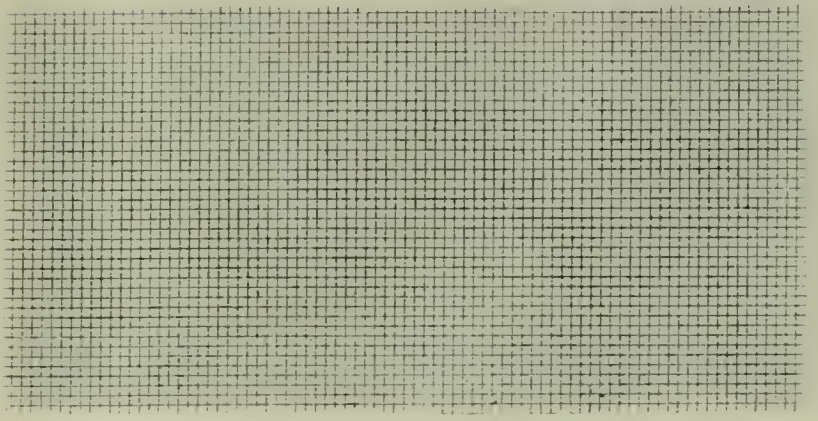

DESIGN No.

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN Nº

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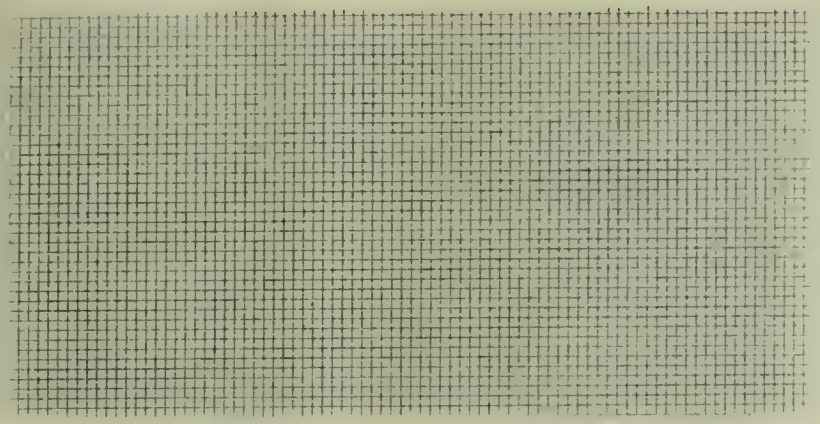
BLACK, WEFT. WHITE, WARP.



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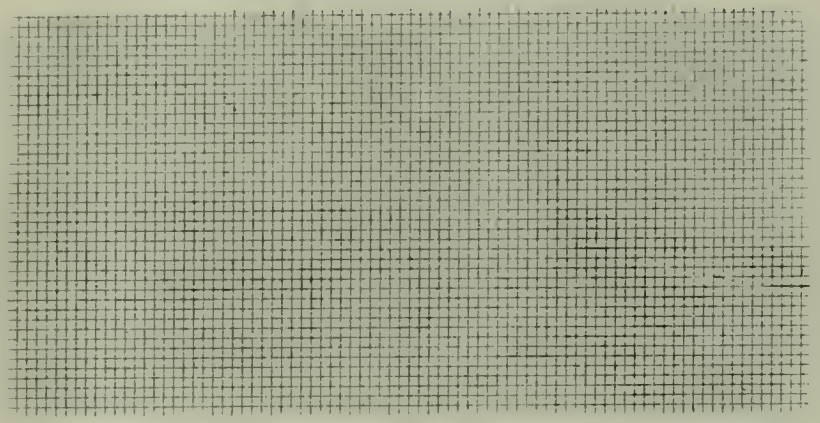

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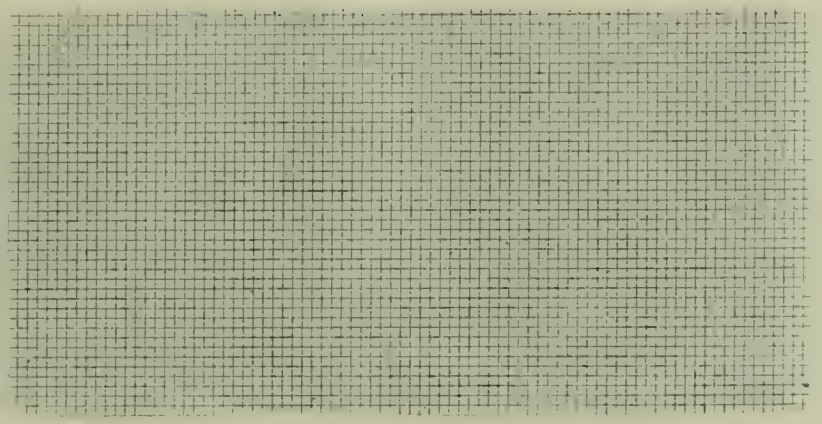

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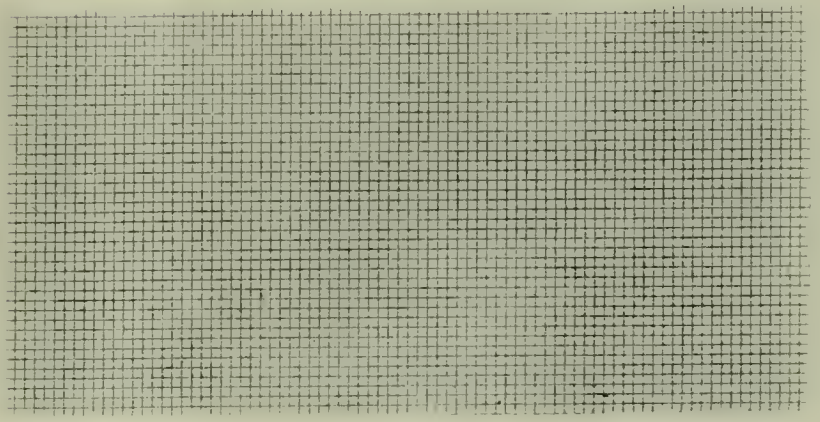

DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

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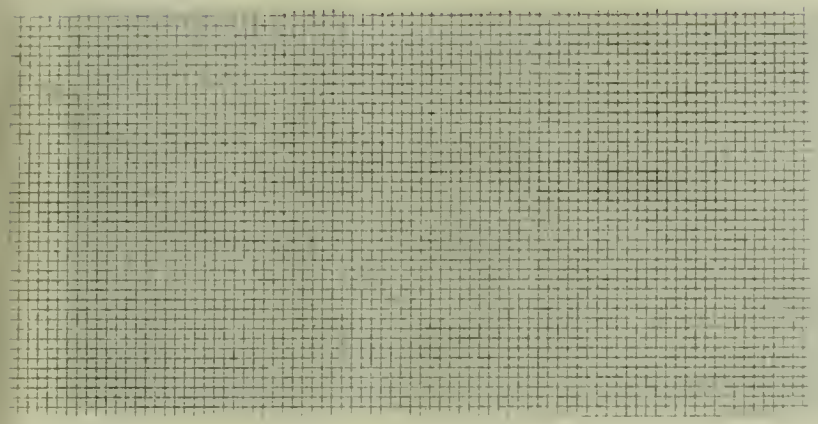

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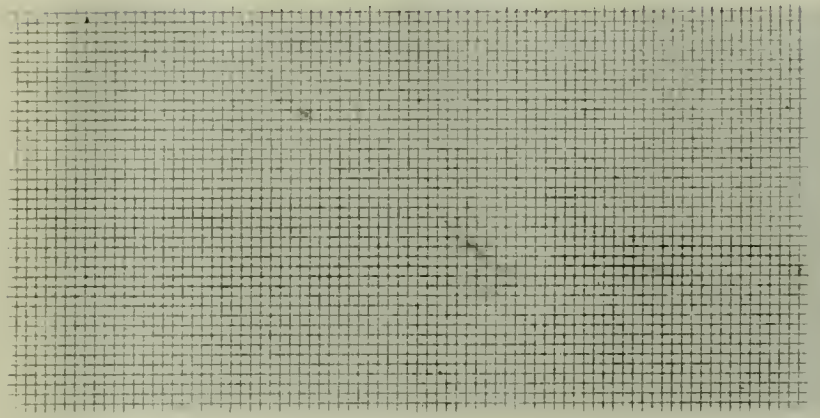

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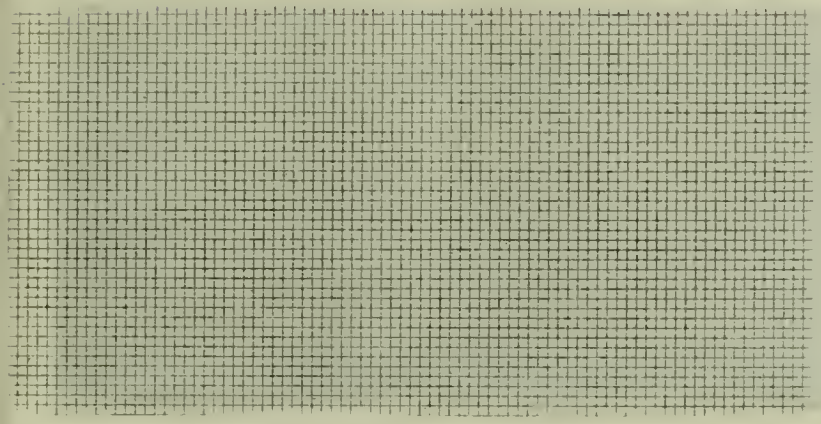

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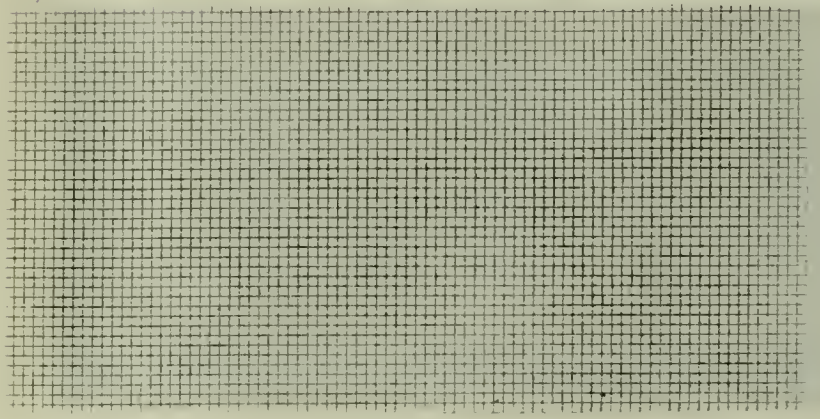

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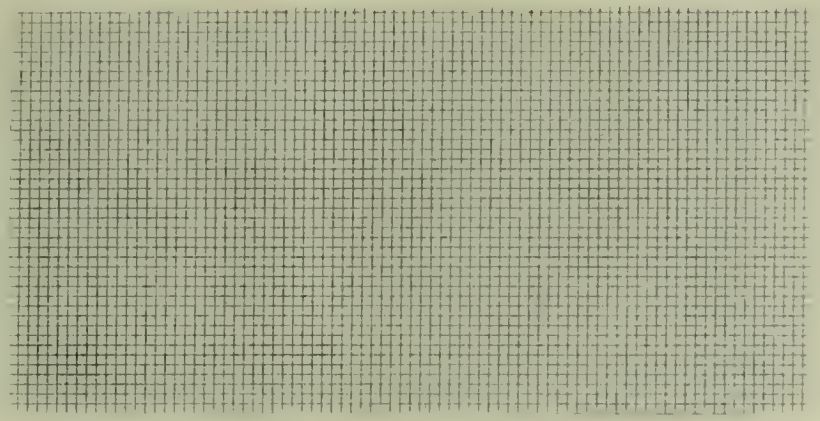

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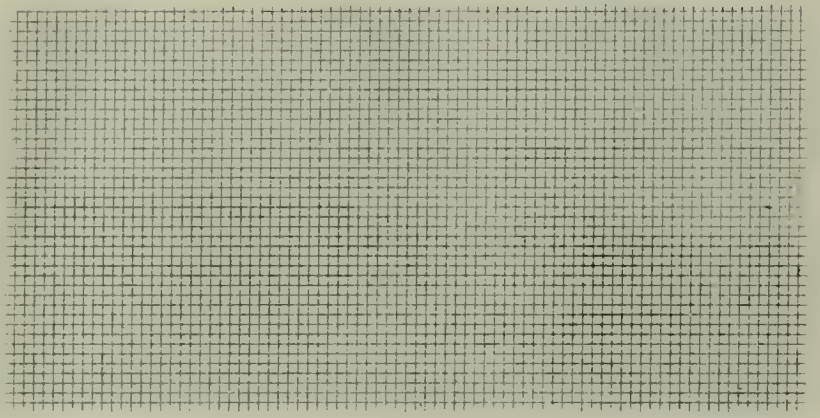

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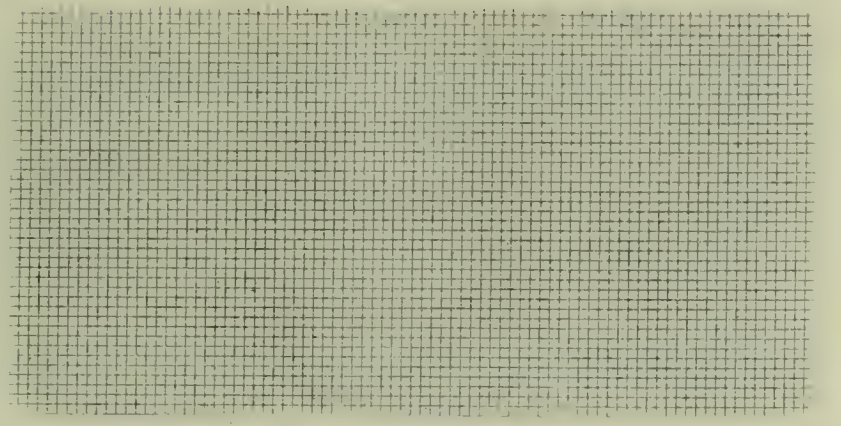

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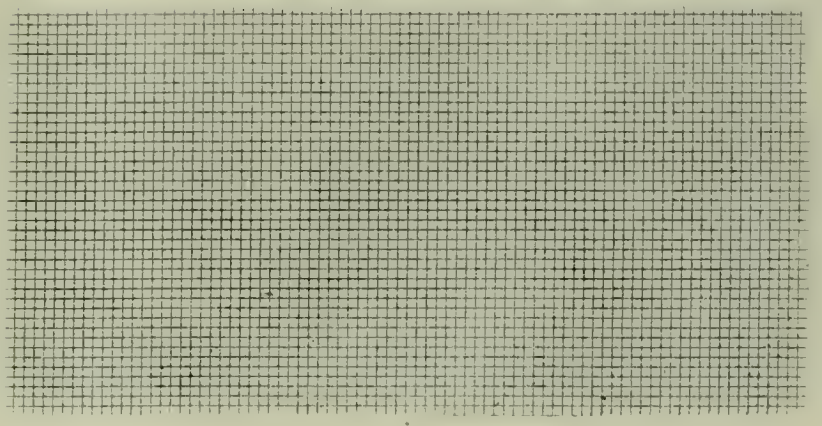

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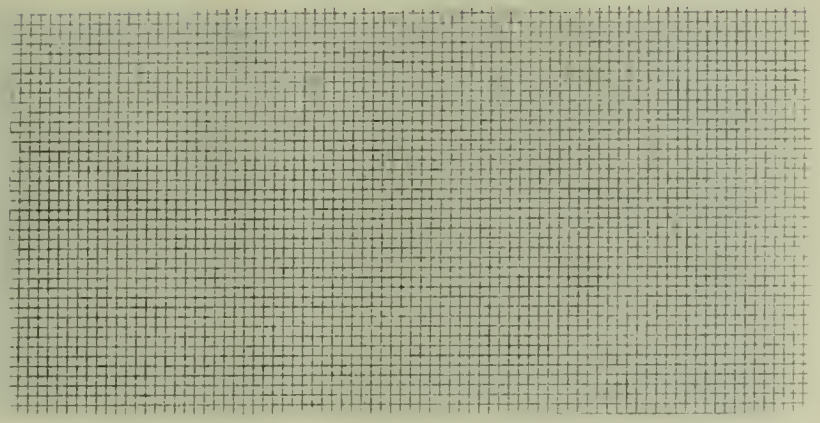

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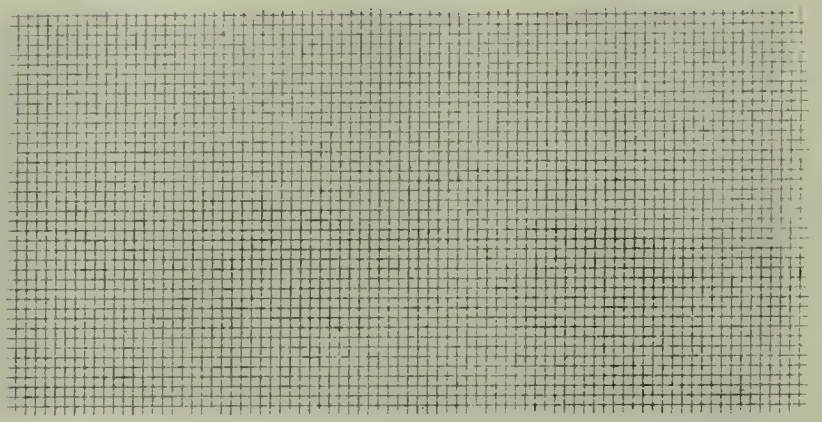

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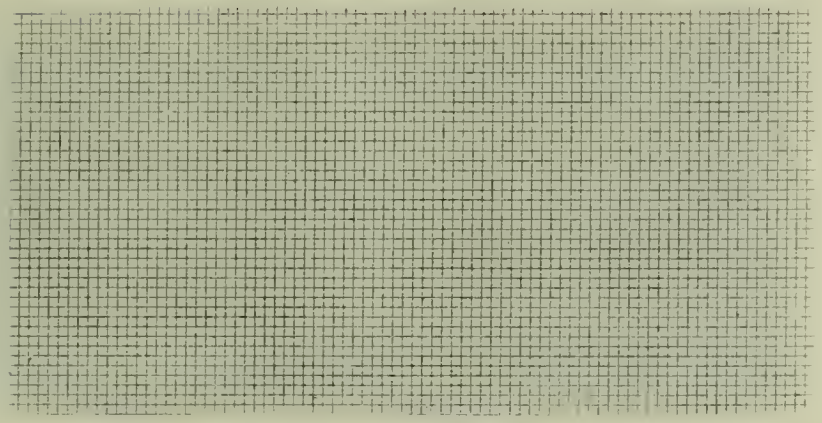

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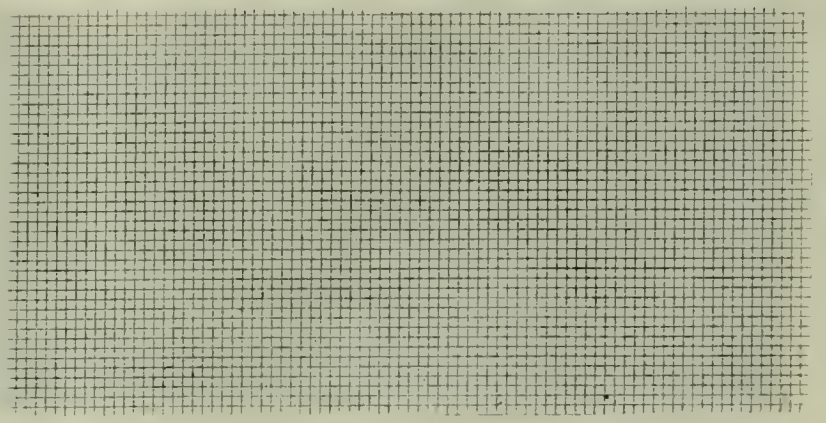

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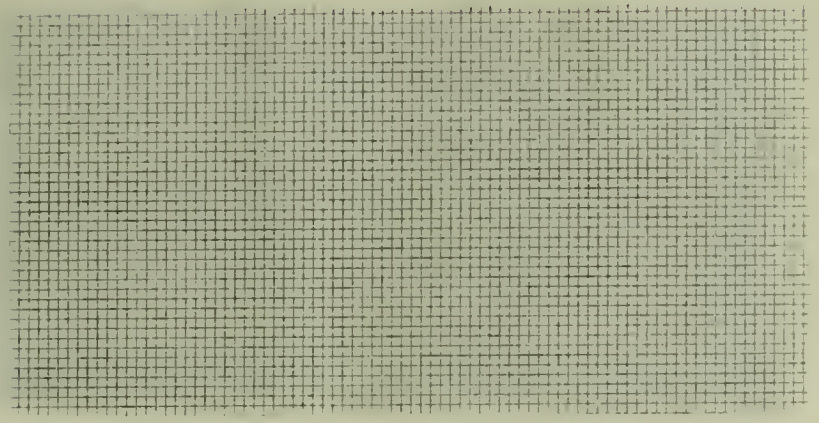
SHAFTS PICKS TO THE ROUND.

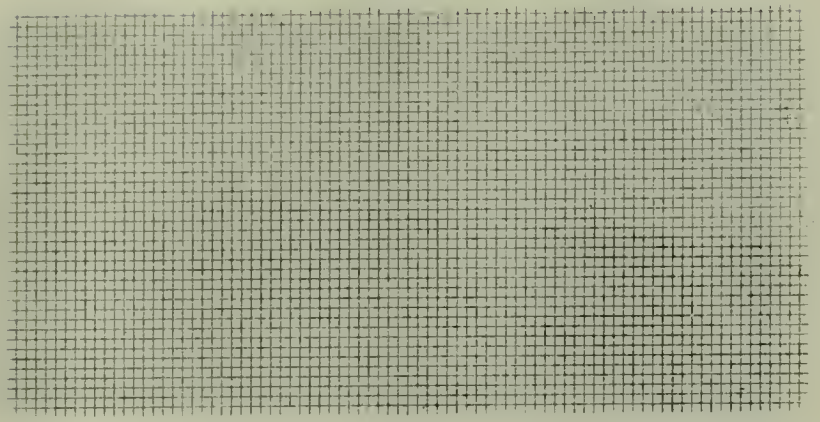
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

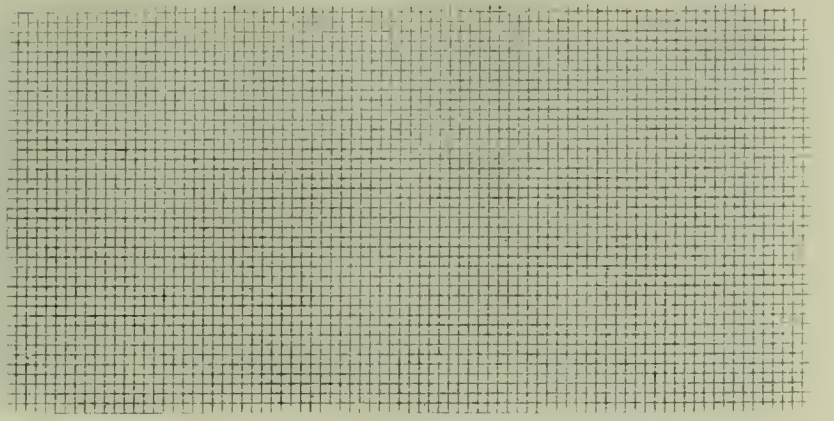
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

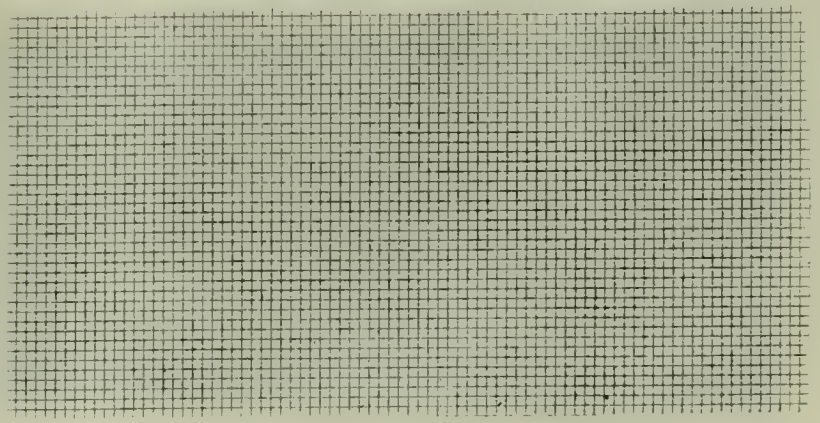
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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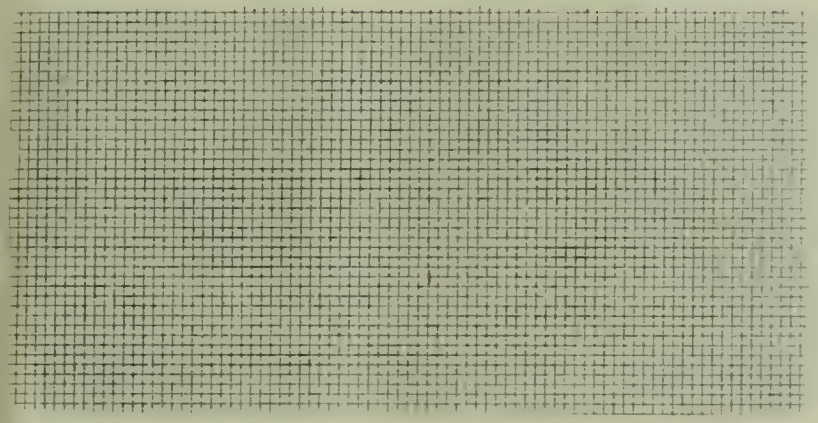
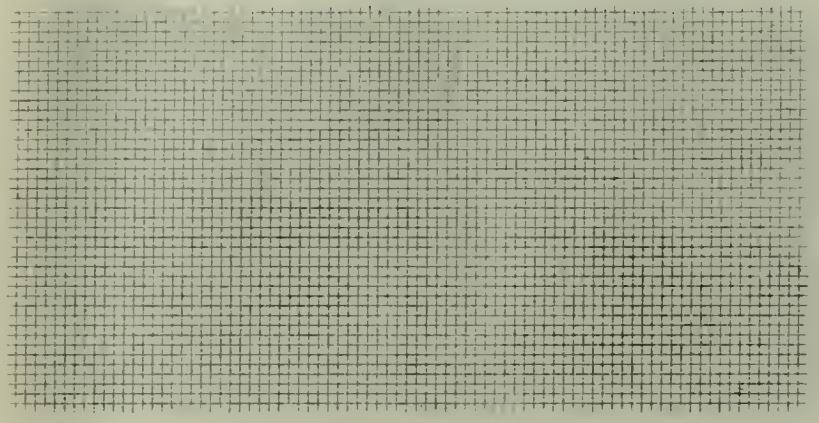
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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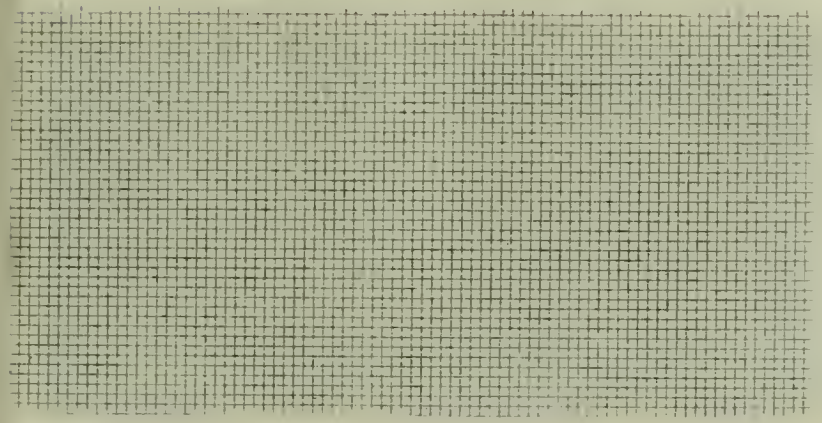
BLACK, WEFT. WHITE, WARP.



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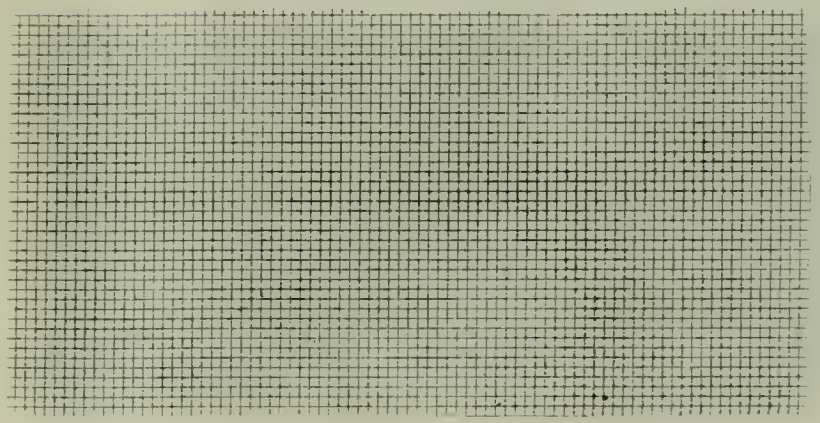

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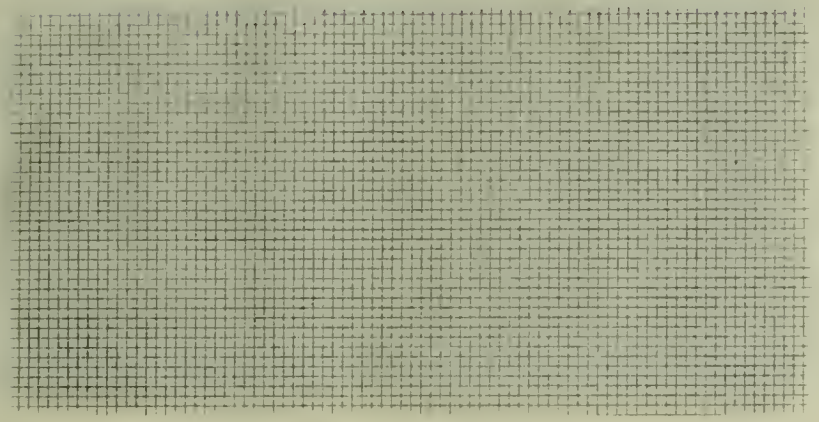
BLACK, WEFT. WHITE, WARP.



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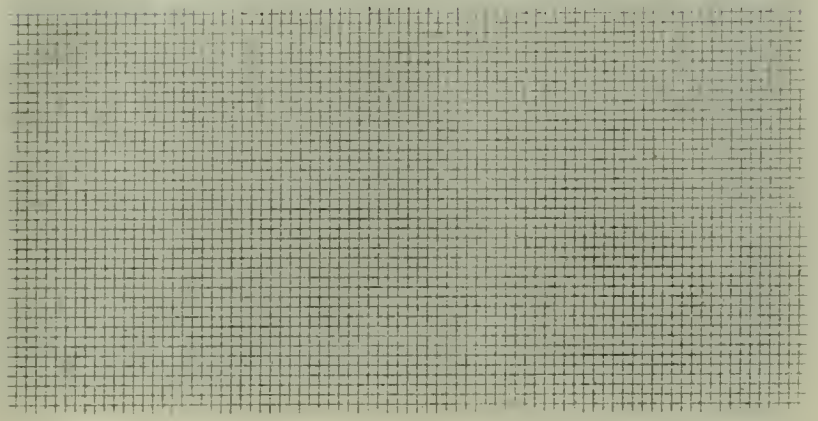
BLACK, WEFT. WHITE, WARP.



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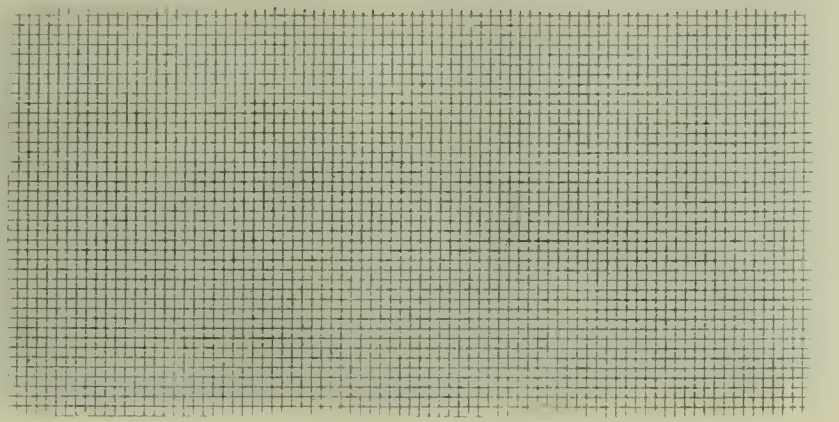

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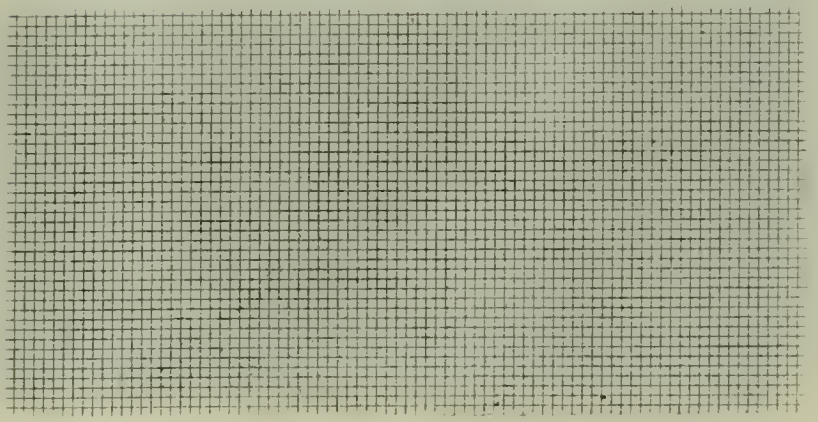
BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK WEFT. WHITE WARP

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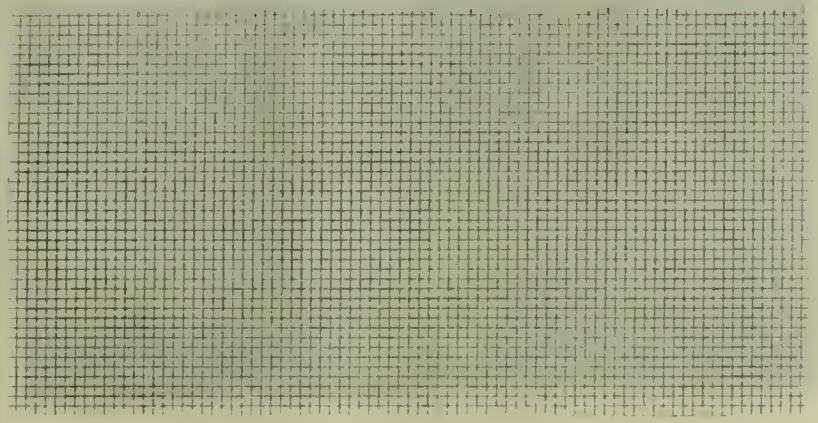
DESIGN Nº

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



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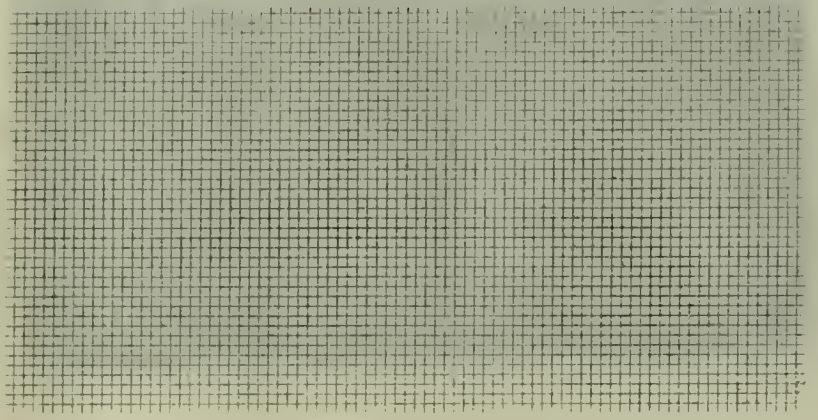
SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



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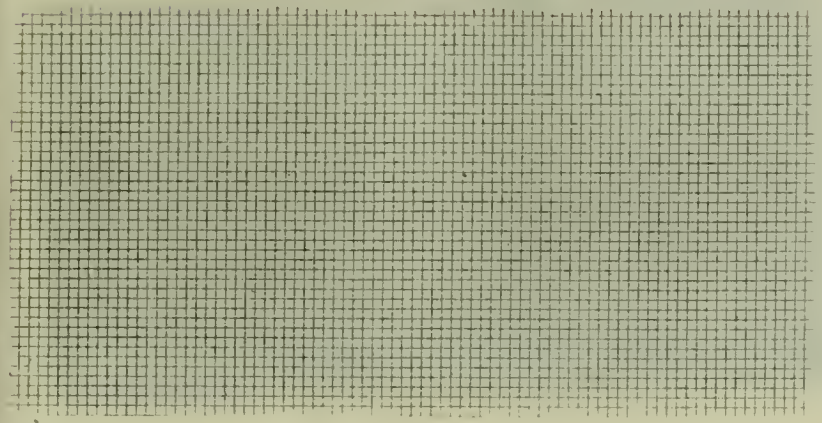
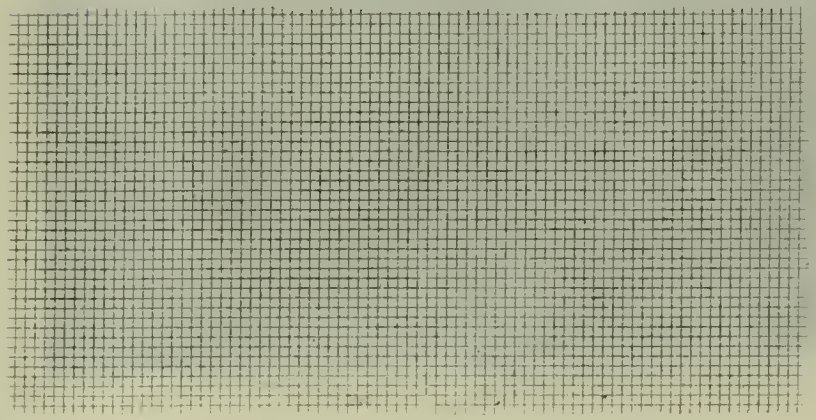
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE POUND

BLACK. WEFT. WHITE. WARP

DESIGN No

SHAFTS PICKS TO THE POUND

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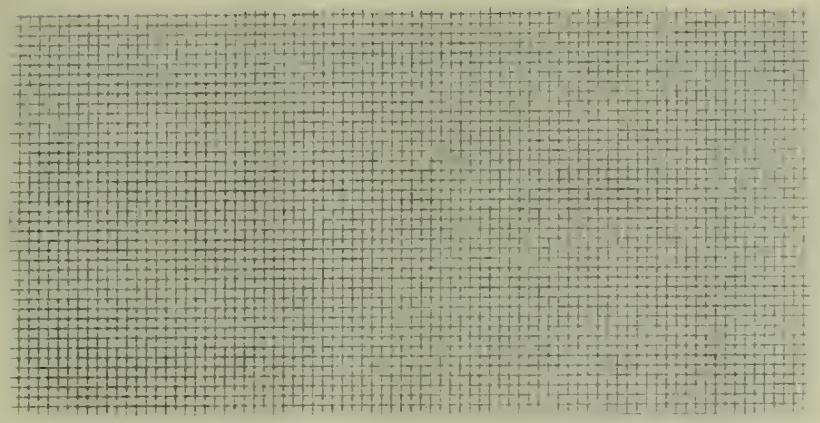
BLACK, WEFT. WHITE, WARP.



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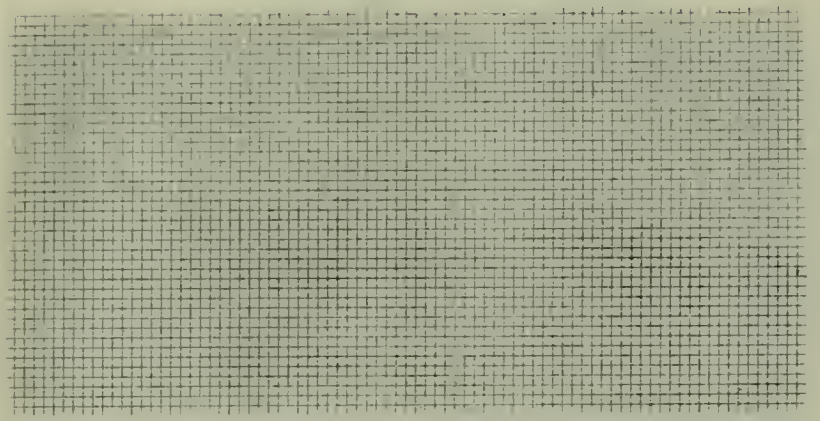
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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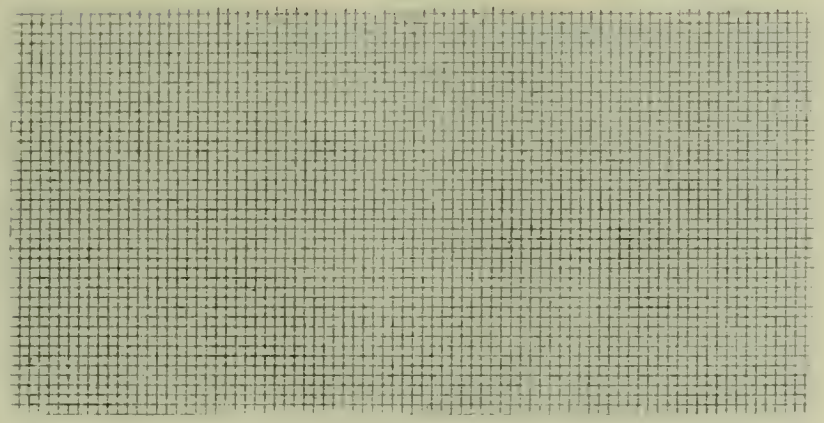
SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



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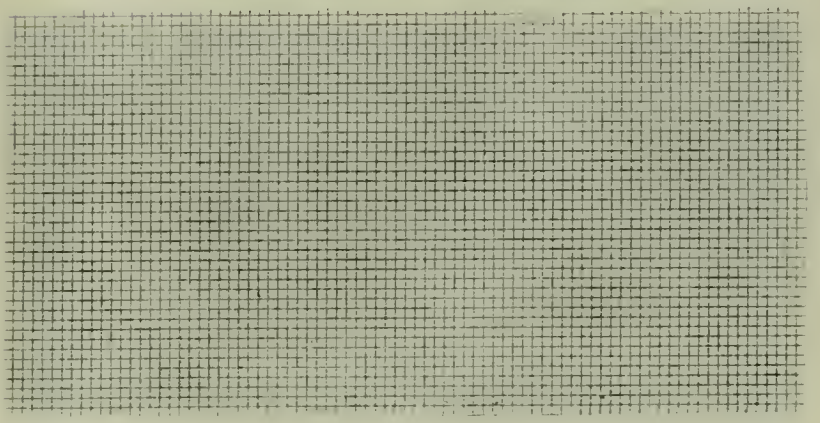
SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



BLACK, WEFT. WHITE, WARP.
SHAFTS
PICKS TO THE ROUND

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

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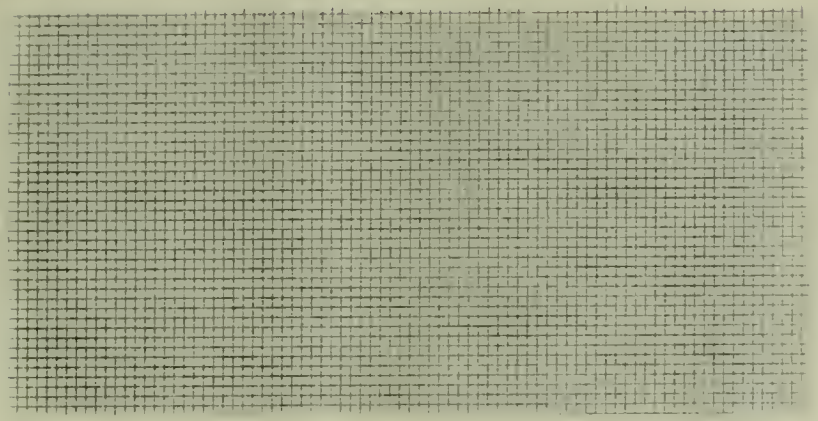

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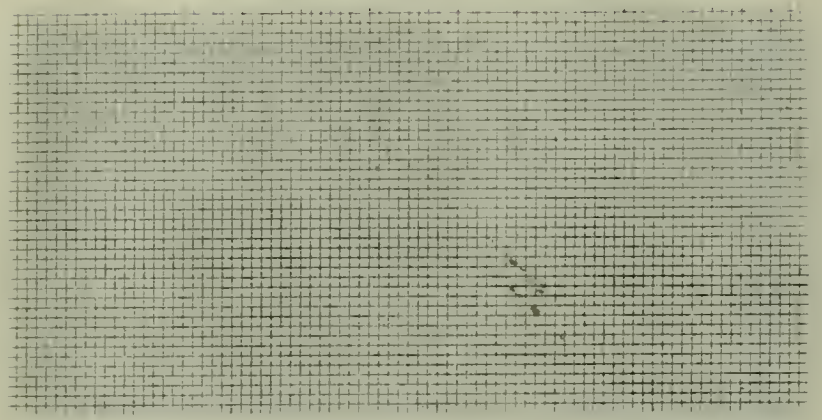
BLACK, WEFT. WHITE, WARP.



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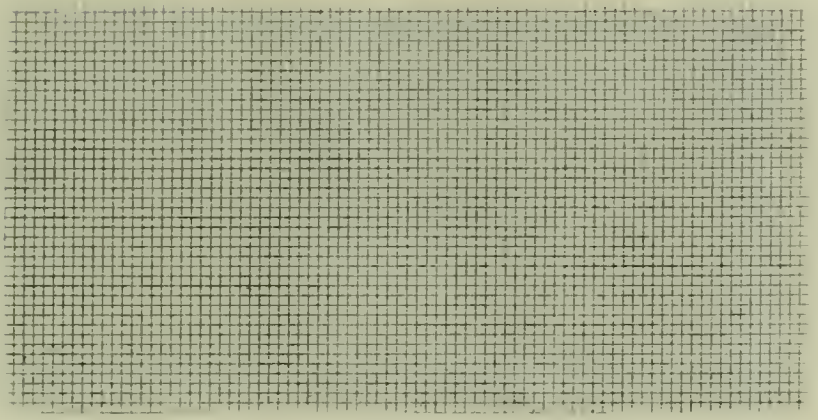
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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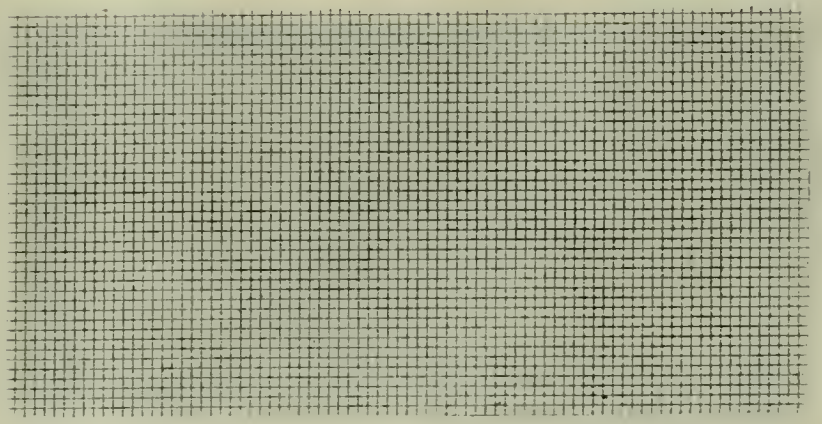
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



SHAFTS PICKS TO THE POUND

BLACK, WEFT. WHITE, WARP.

SHAFTS PICKS TO THE POUND

BLACK, WEFT. WHITE, WARP.

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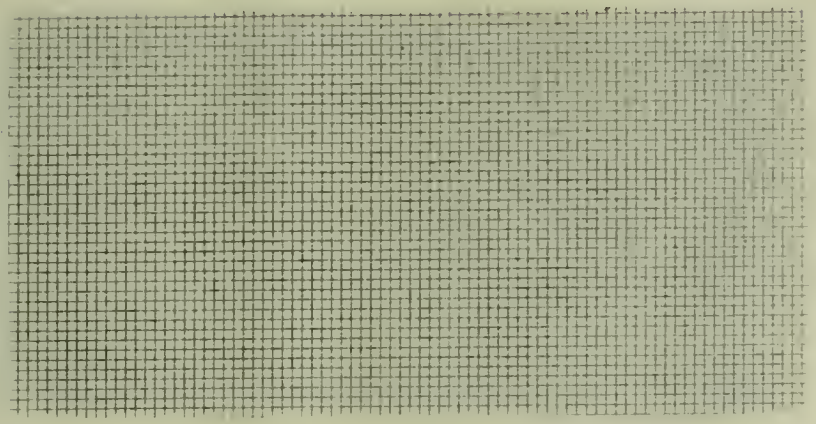
BLACK, WEFT. WHITE, WARP.



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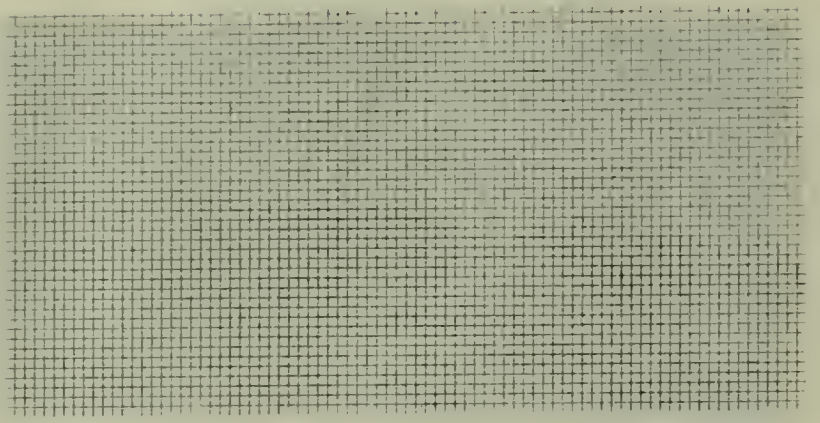
BLACK, WEFT. WHITE, WARP.



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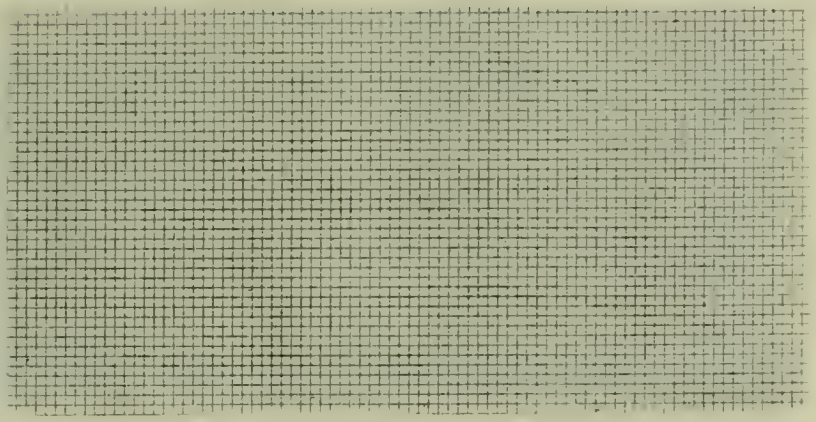

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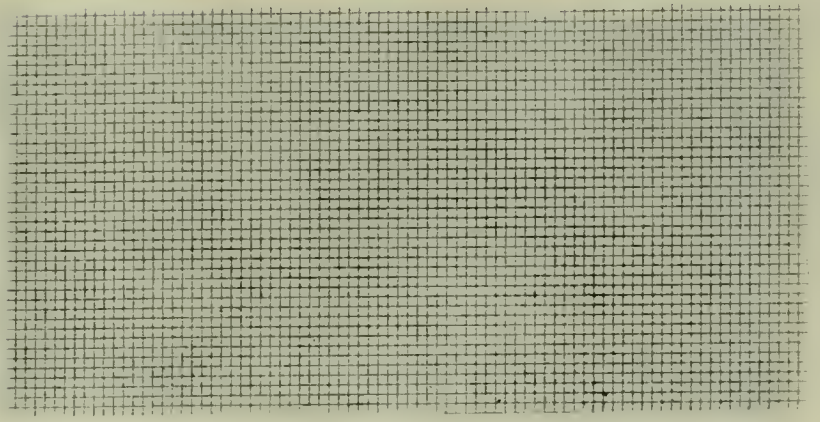

DESIGN NO

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DESIGN Nº

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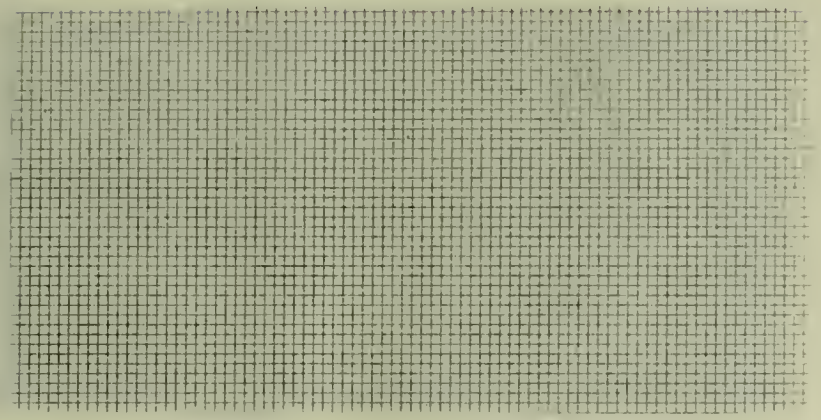
BLACK, WEFT. WHITE, WARP.



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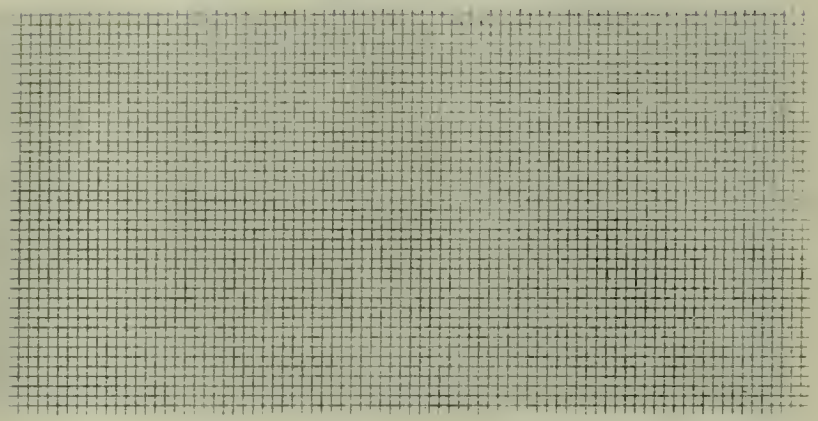

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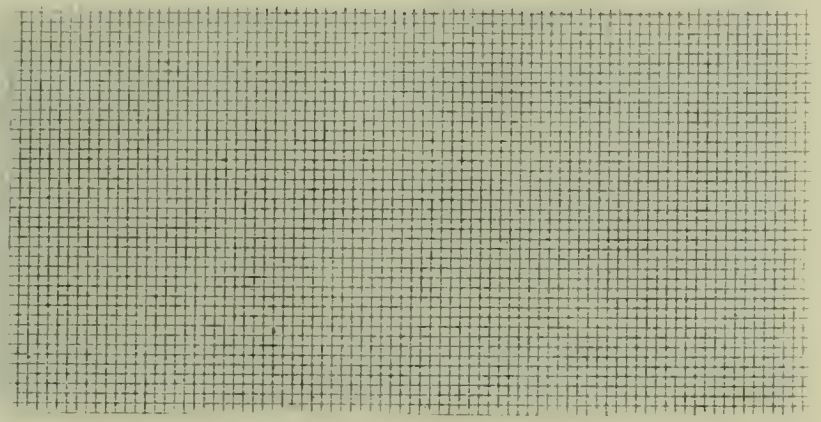
BLACK, WEFT. WHITE, WARP.



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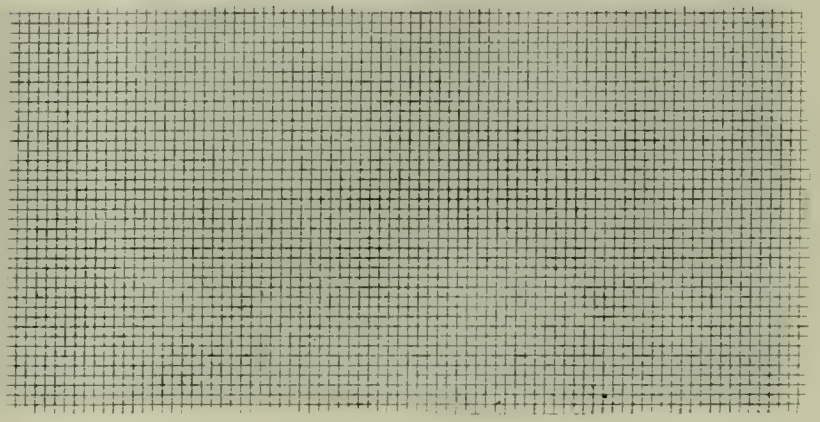
BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE POUND

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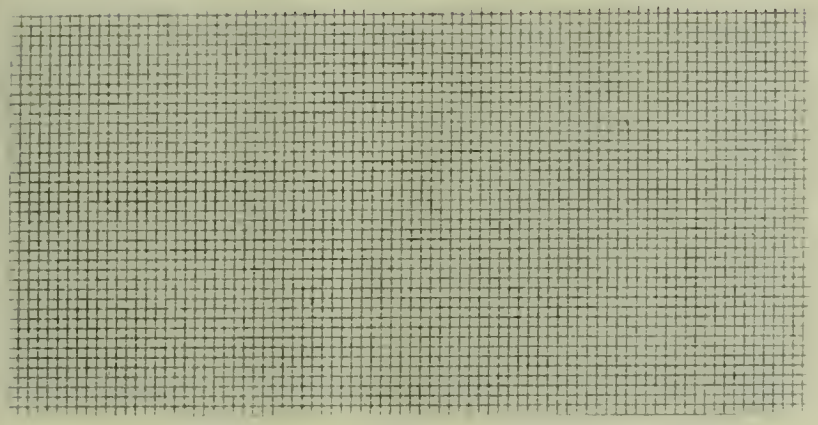
BLACK, WEFT. WHITE, WARP.



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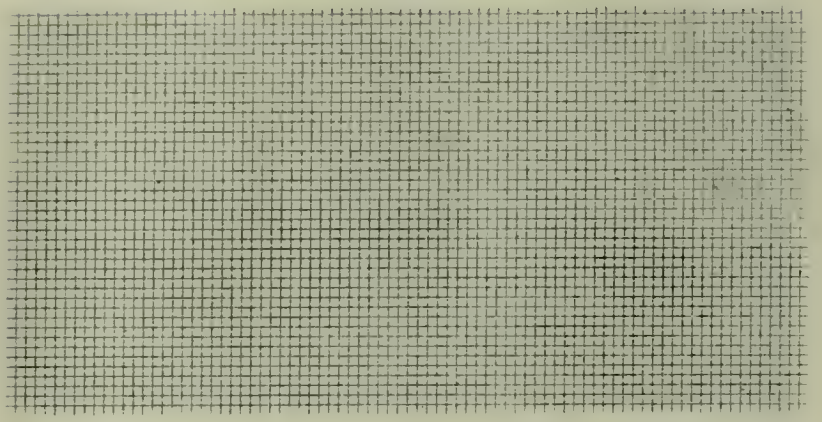

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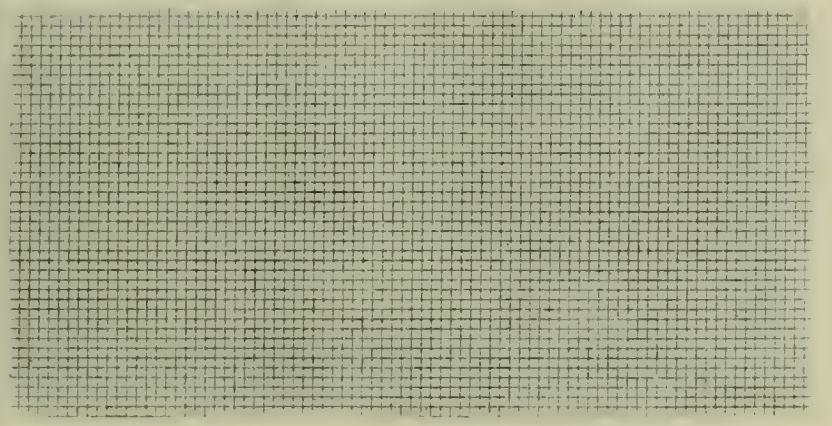

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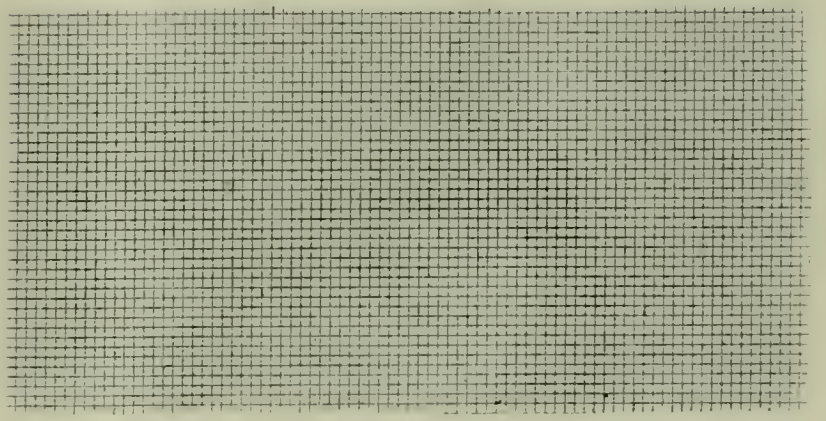

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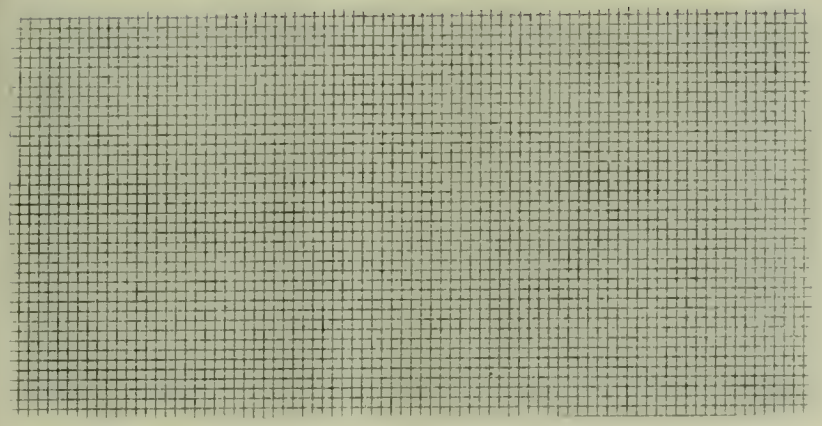

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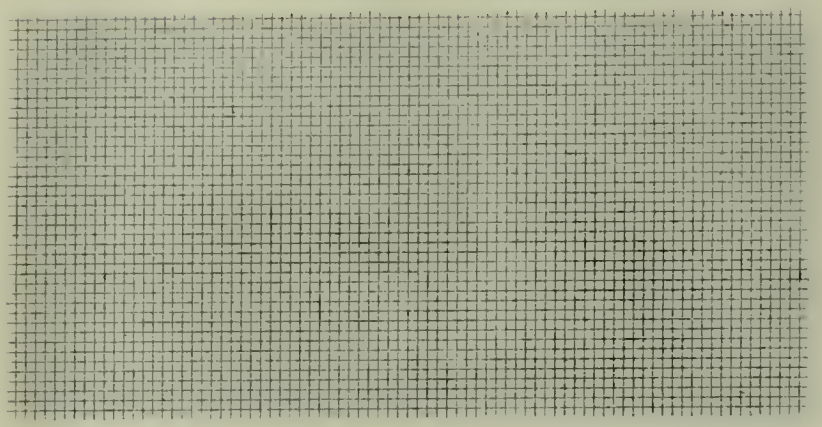

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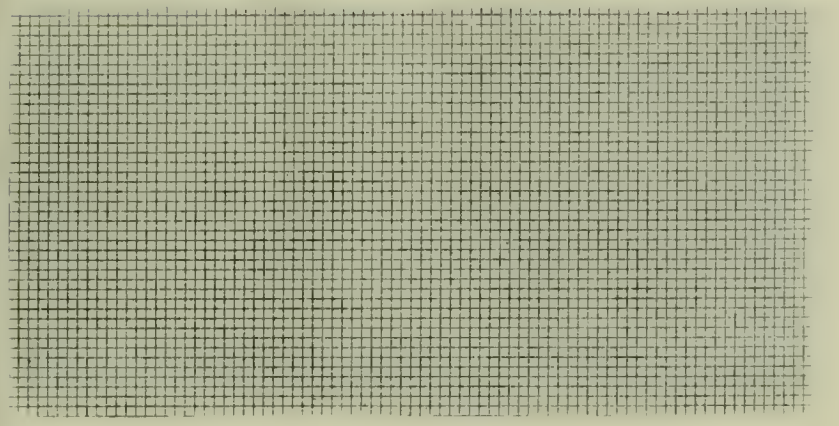

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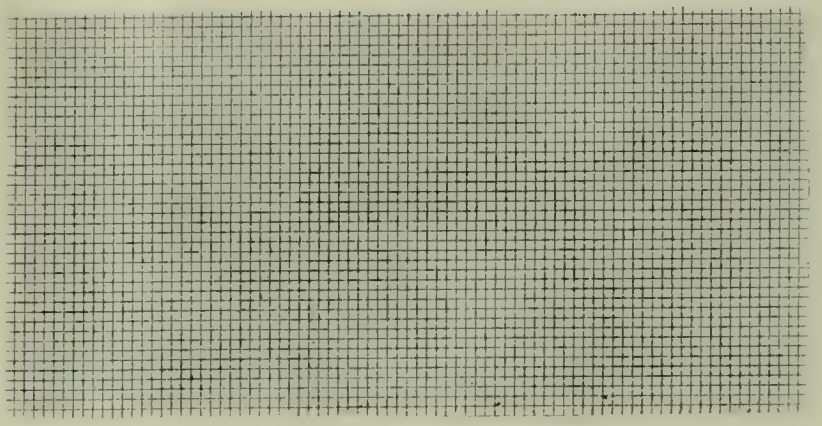

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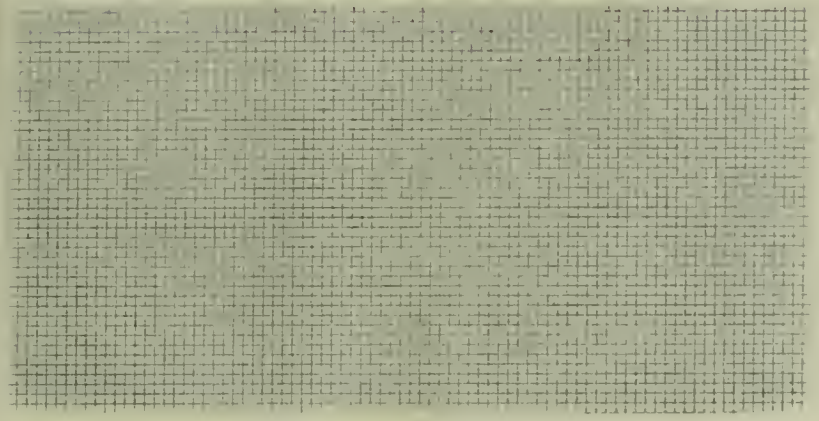

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SHAFTS PICKS TO THE ROUND.

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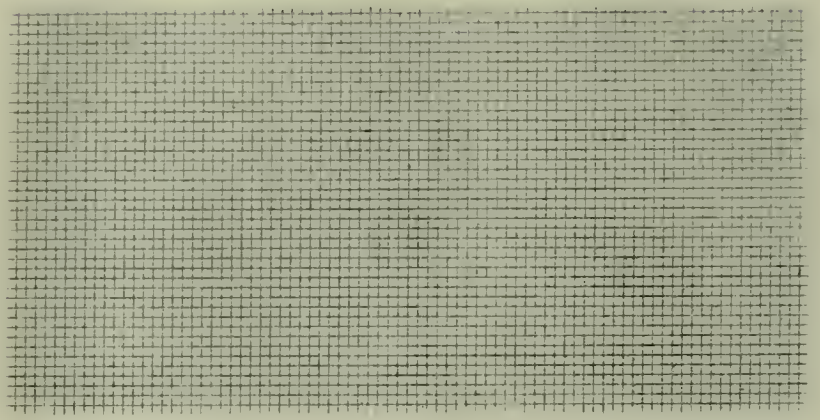

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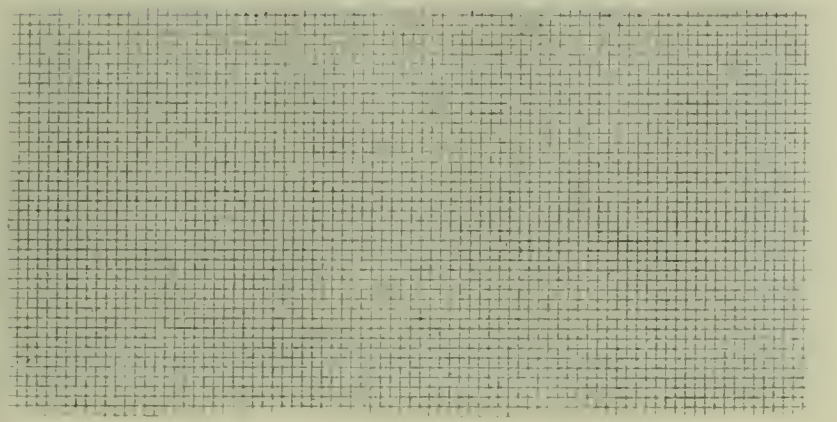

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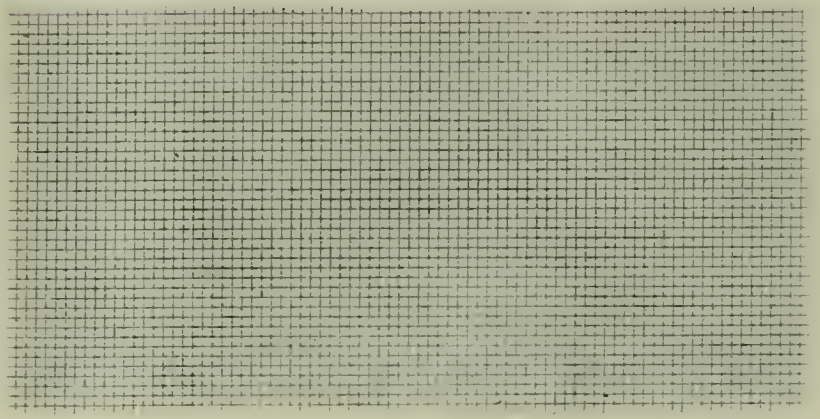


SHAFTS PICKS TO THE ROUND

BLACK, WEFT WHITE, WARP.

SHAFTS PICKS TO THE ROUND

BLACK, WEFT WHITE, WARP.

DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT WHITE, WARP.

DESIGN No

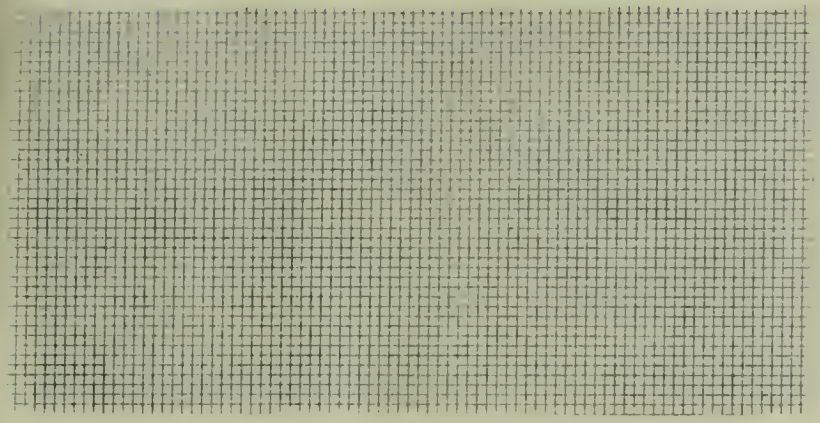
SHAFTS PICKS TO THE ROUND

BLACK, WEFT WHITE, WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

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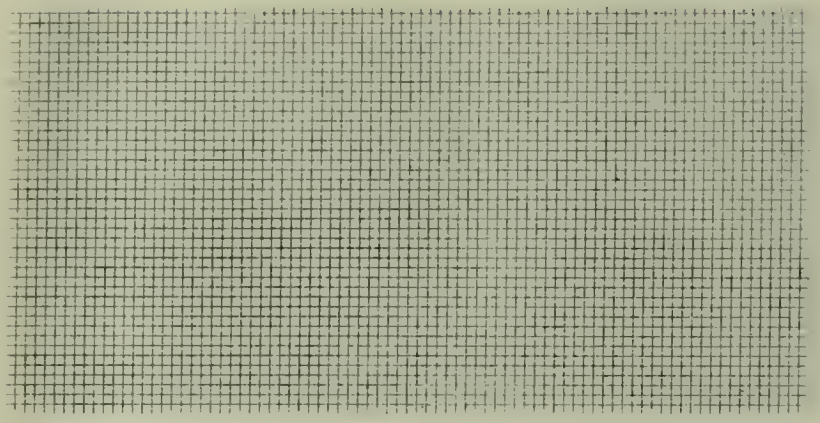

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

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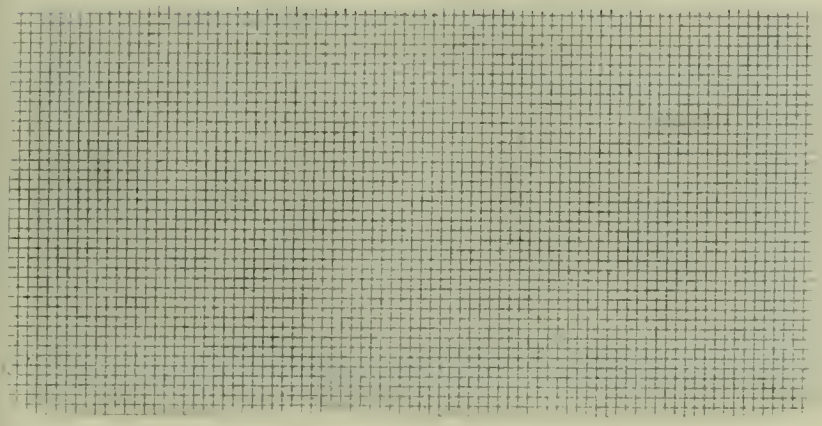

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

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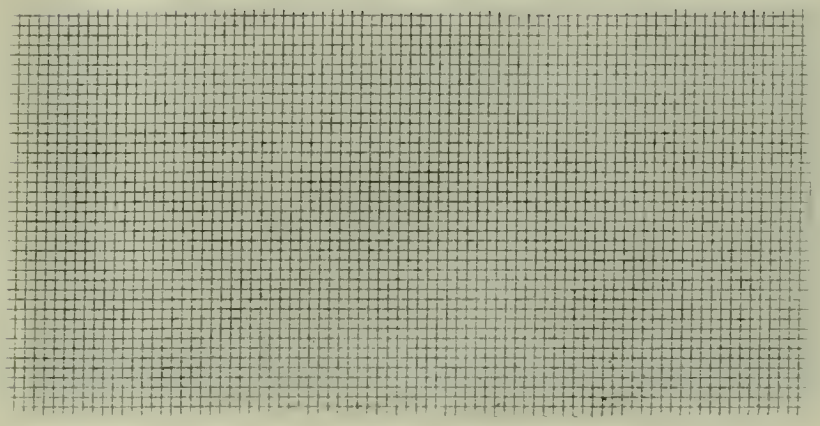


DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT WHITE, WARP

DESIGN No

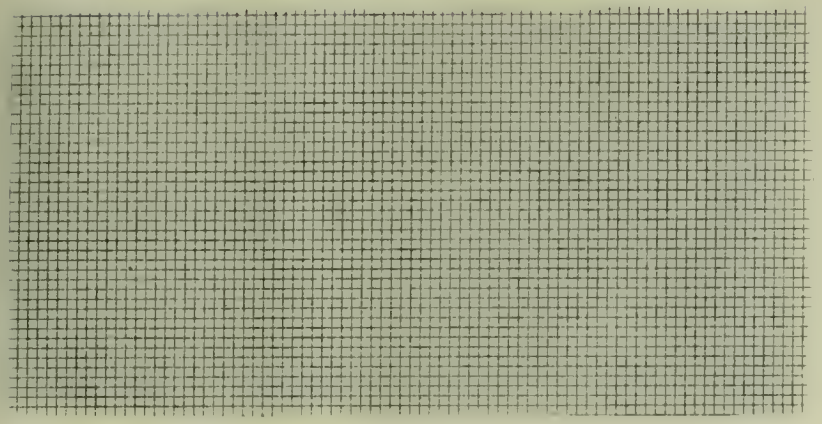
SHAFTS PICKS TO THE ROUND

BLACK, WEFT WHITE, WARP

DESIGN Nº

SHAFTS PICKS TO THE ROUND

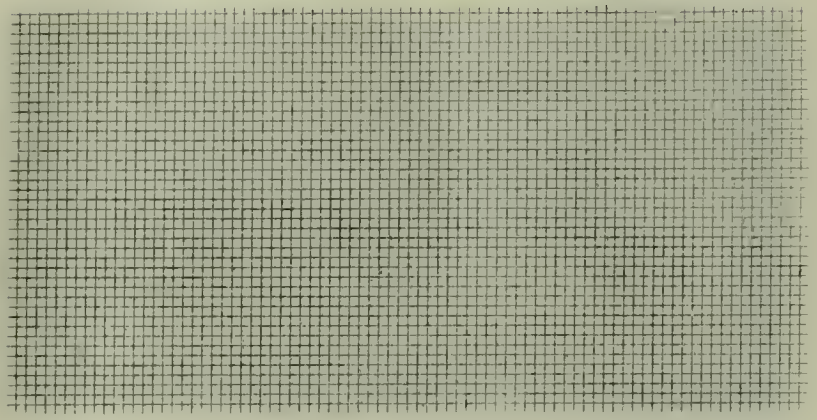
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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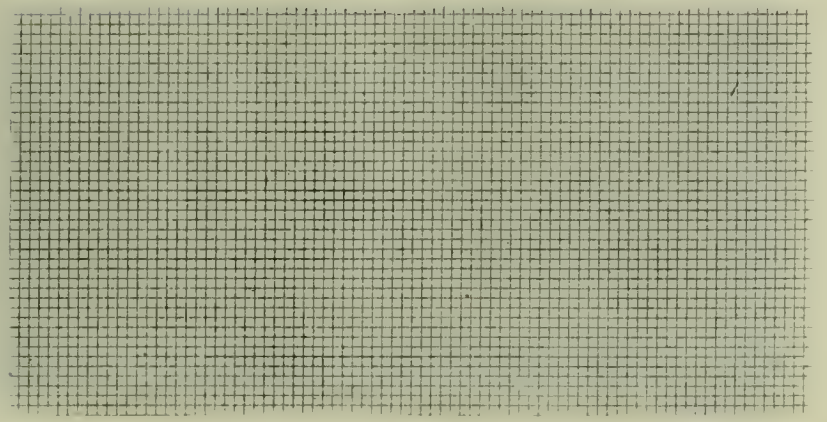
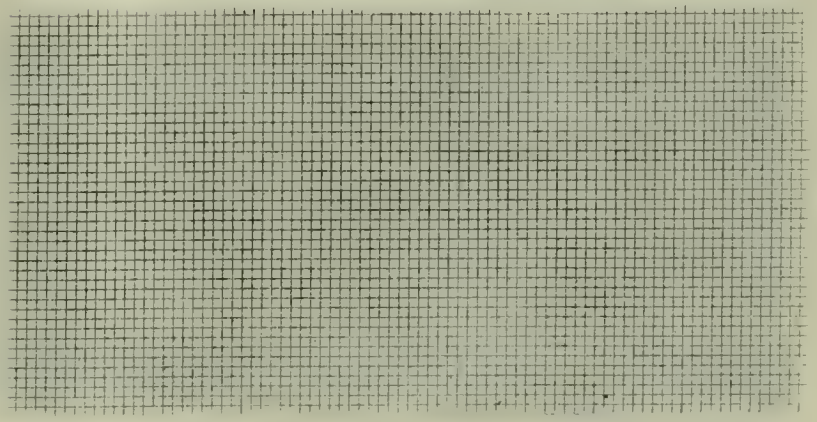
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK WEFT. WHITE WARP

DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK WEFT. WHITE WARP

DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK WEFT. WHITE WARP

DESIGN No

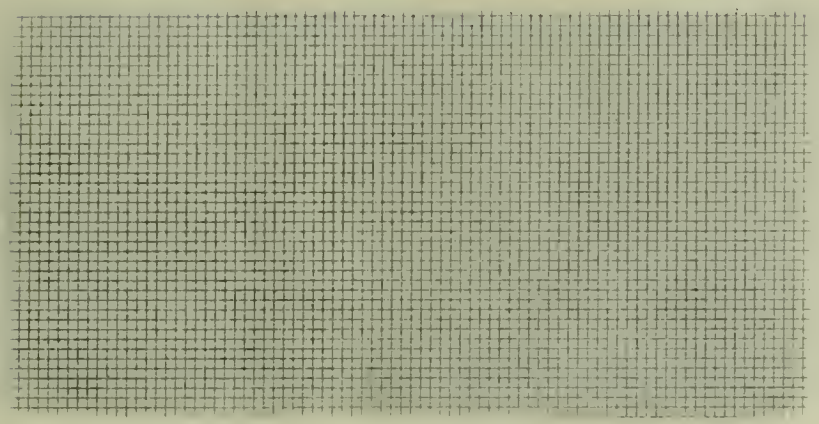
SHAFTS PICKS TO THE ROUND

BLACK WEFT. WHITE WARP

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

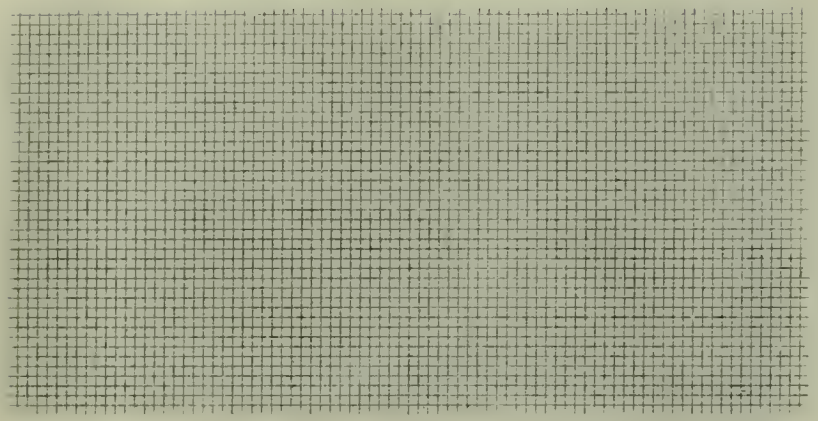
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

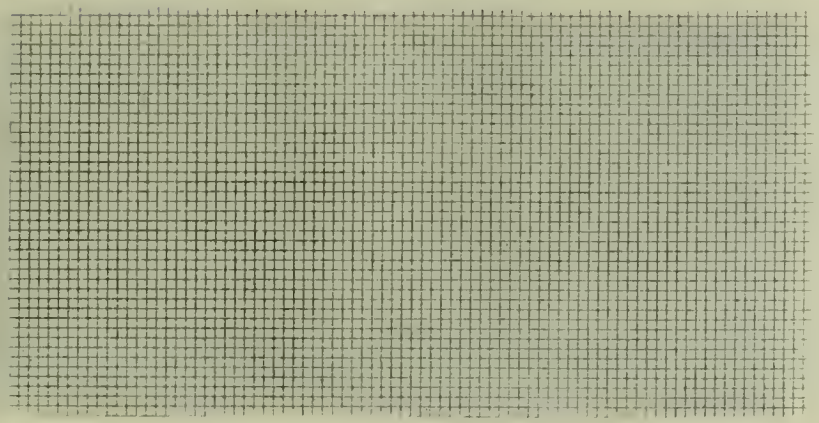
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

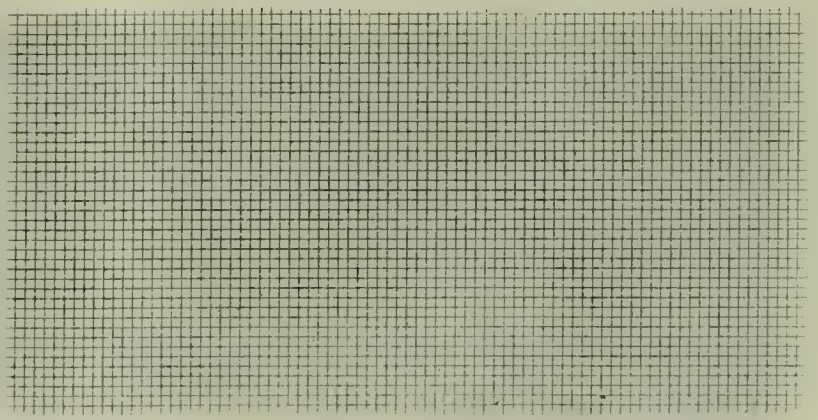
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS — PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN No

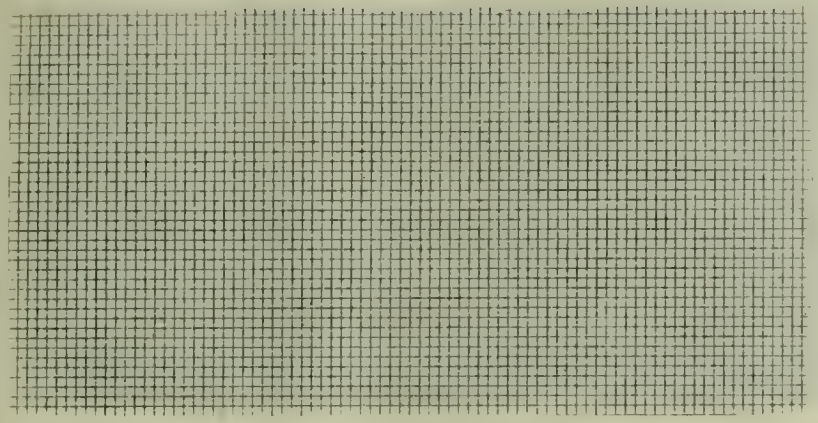
SHAFTS — PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND

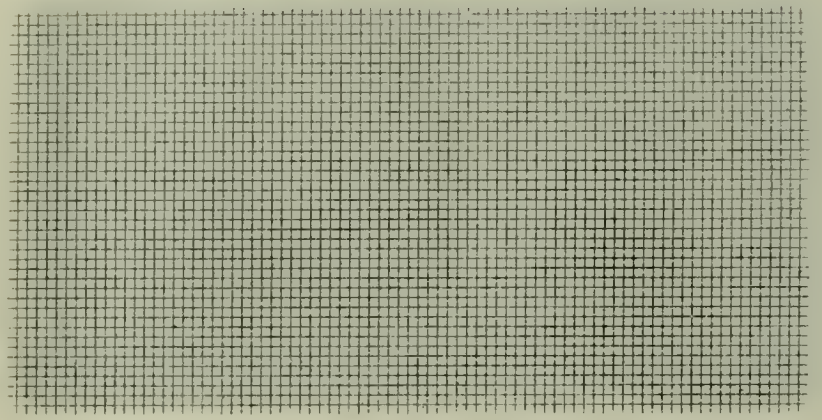
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

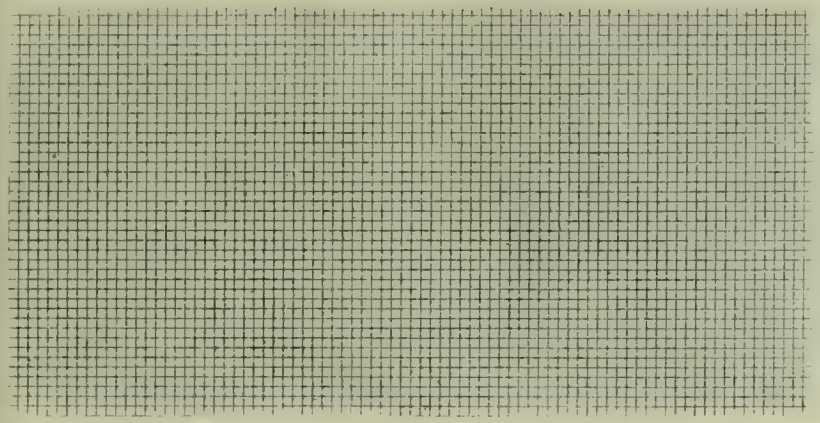
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

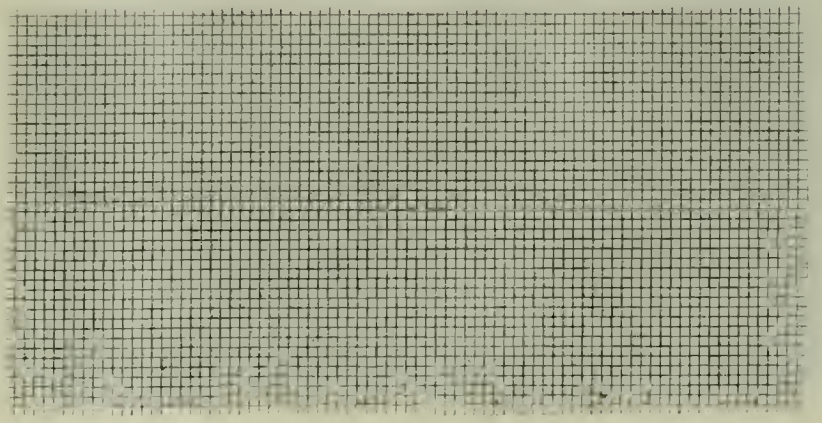
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

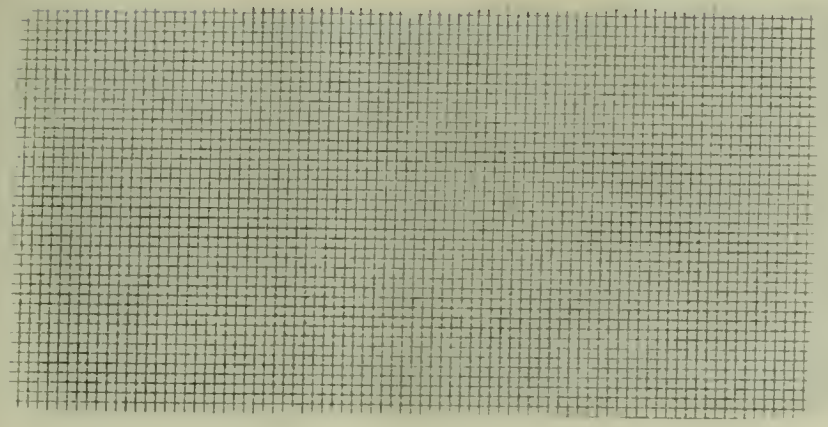
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

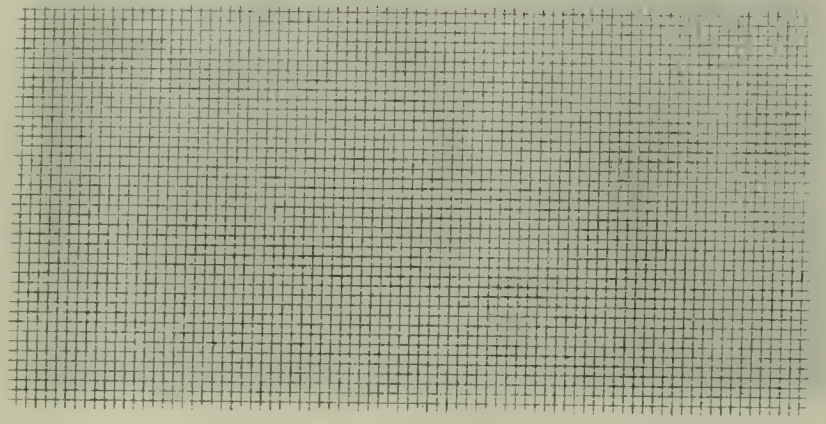
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

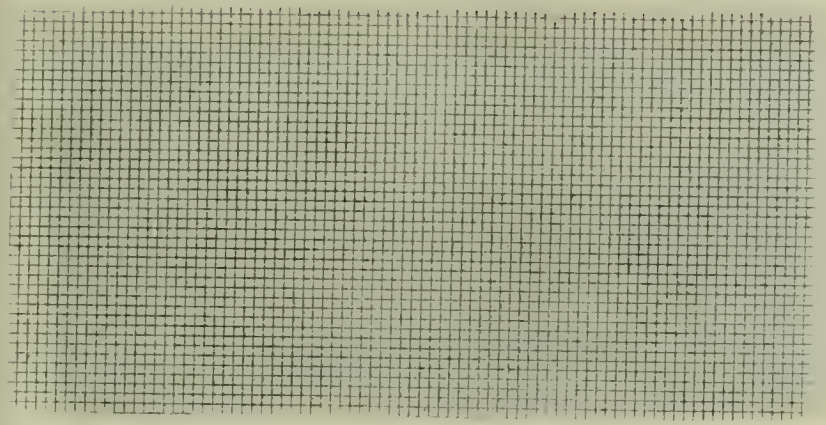
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

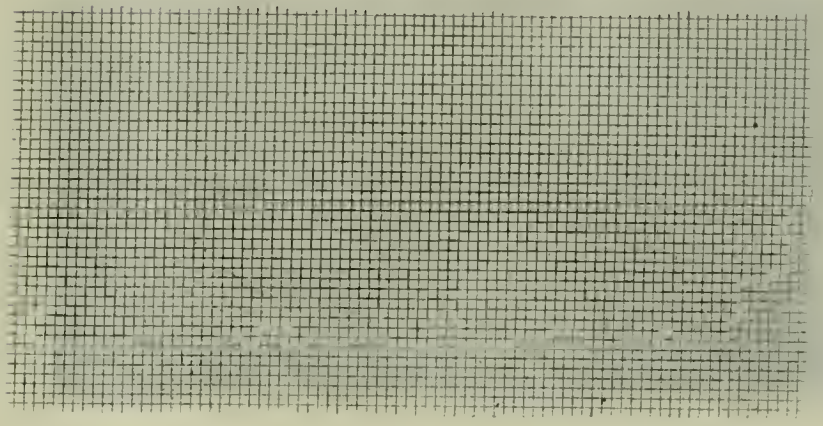
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN No

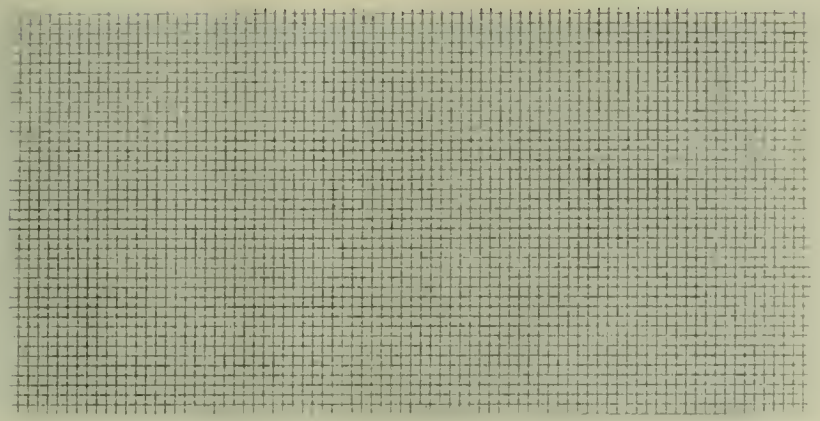
SHAFTS PICKS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

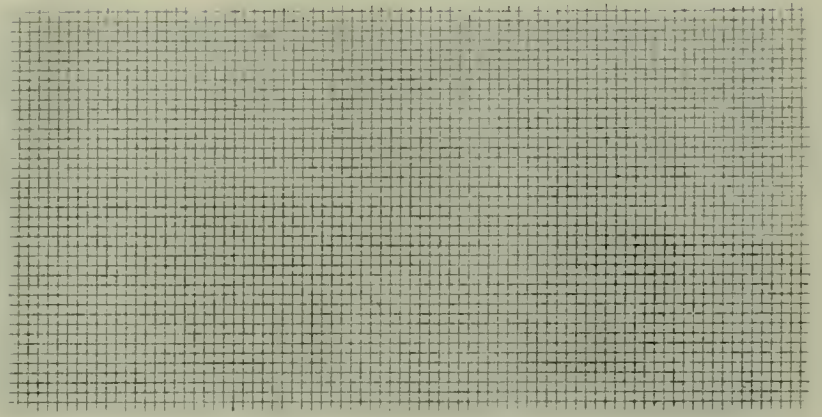
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

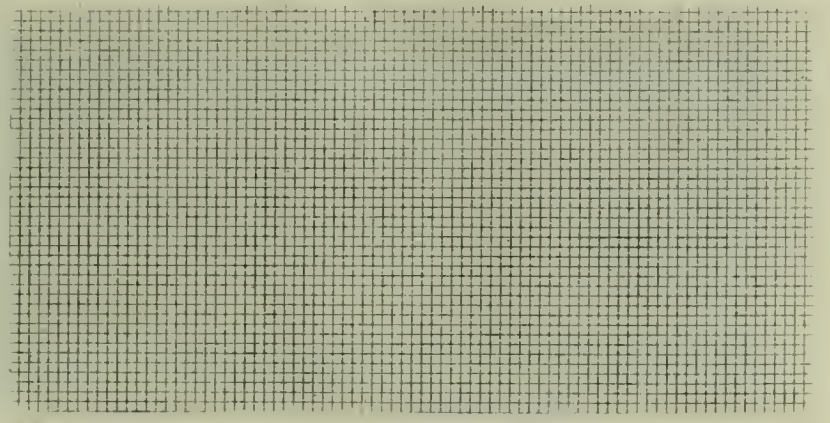
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

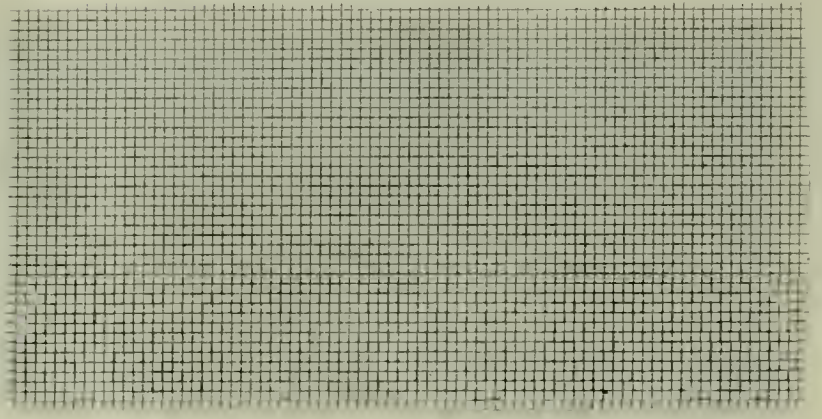
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN NO

SHAFTS PICKS TO THE ROUND

BLACK WEFT WHITE WARP

DESIGN NO

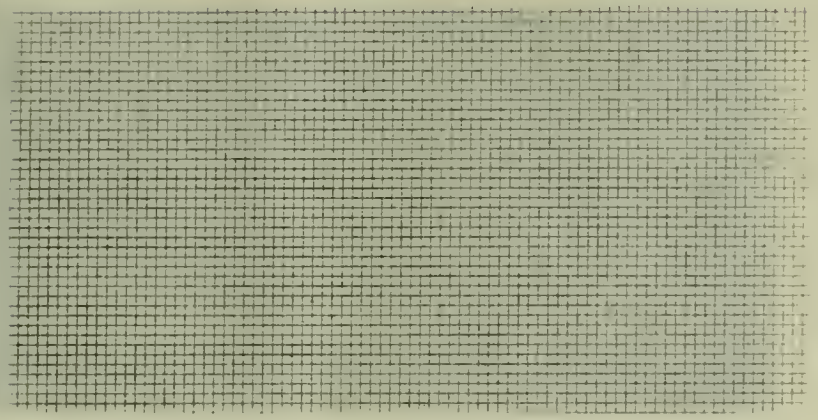
SHAFTS PICKS TO THE ROUND

BLACK WEFT WHITE WARP

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

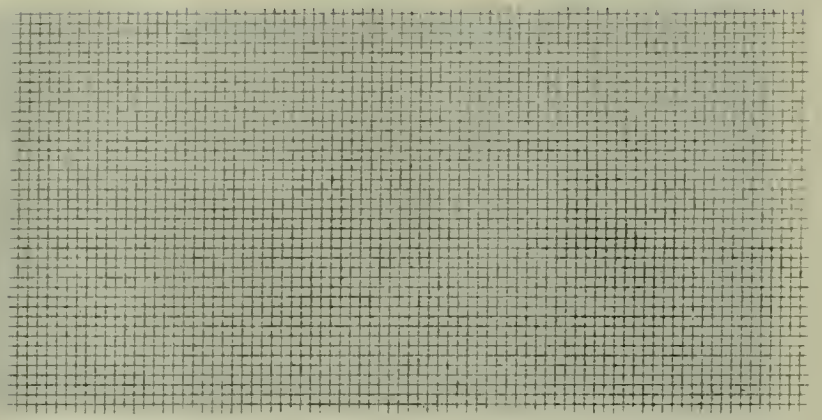
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

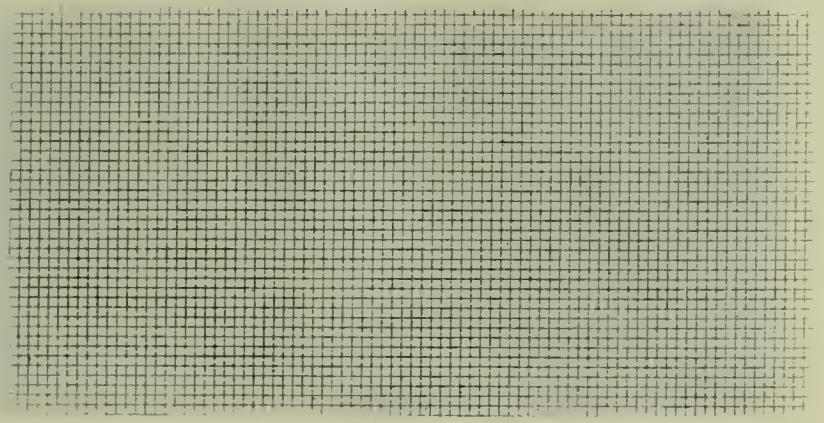
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

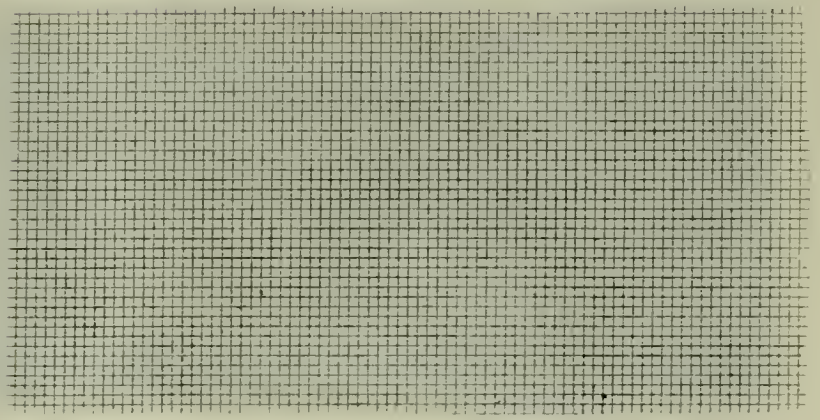
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP

DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP

DESIGN No

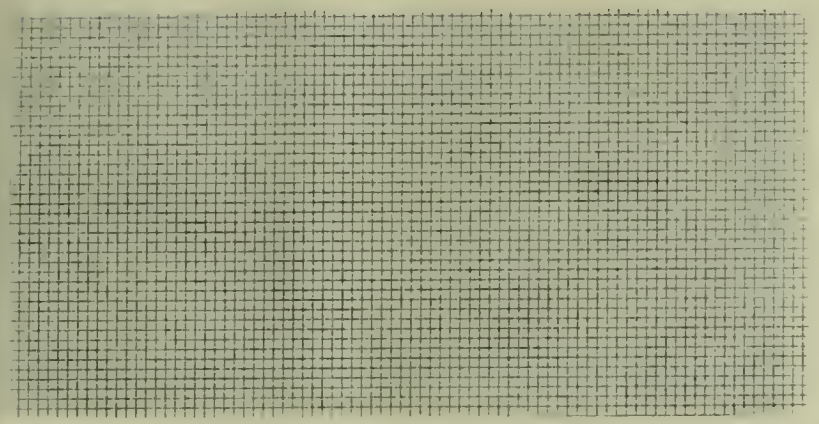
SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

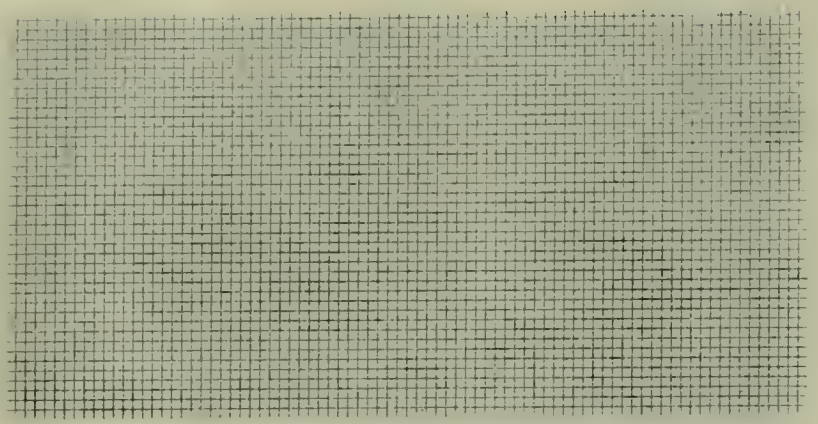
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

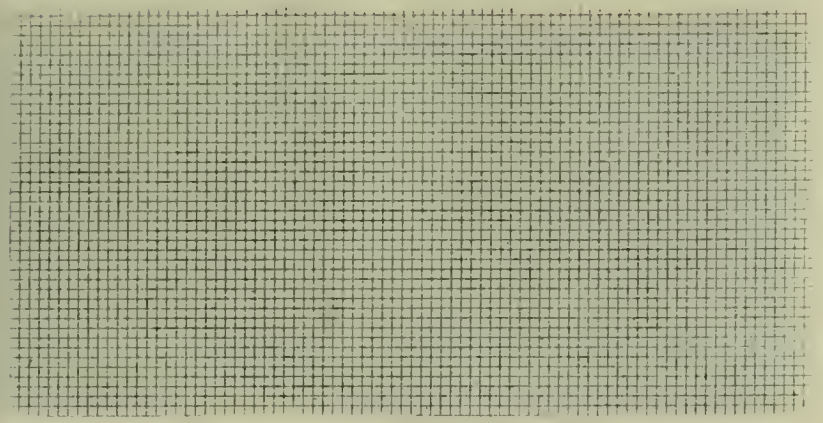
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

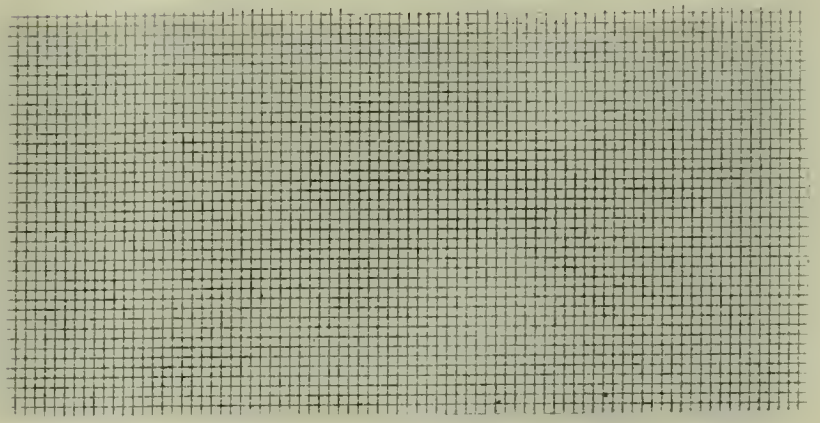
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN No

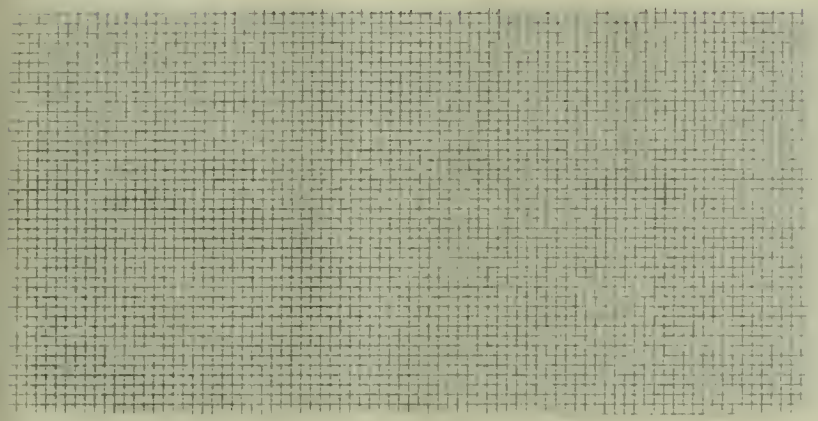
SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND

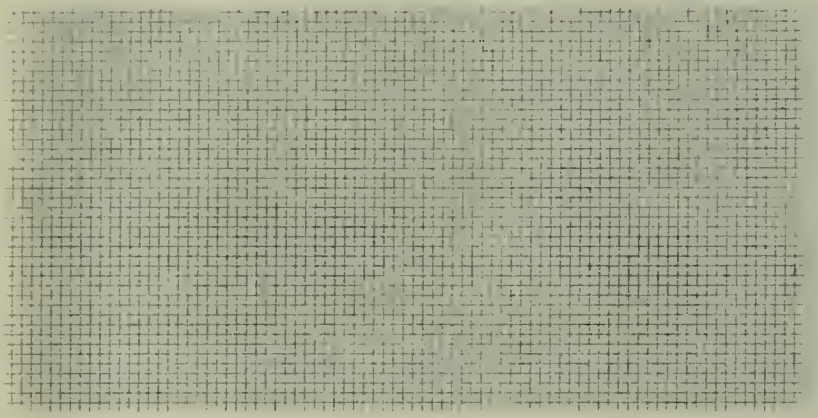
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

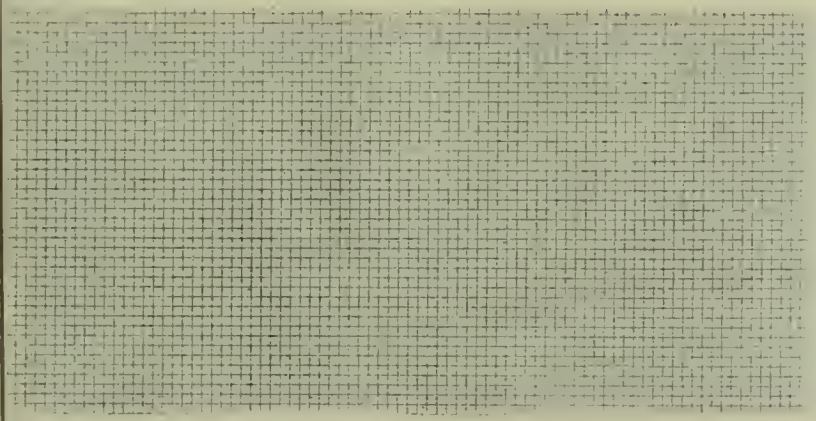
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

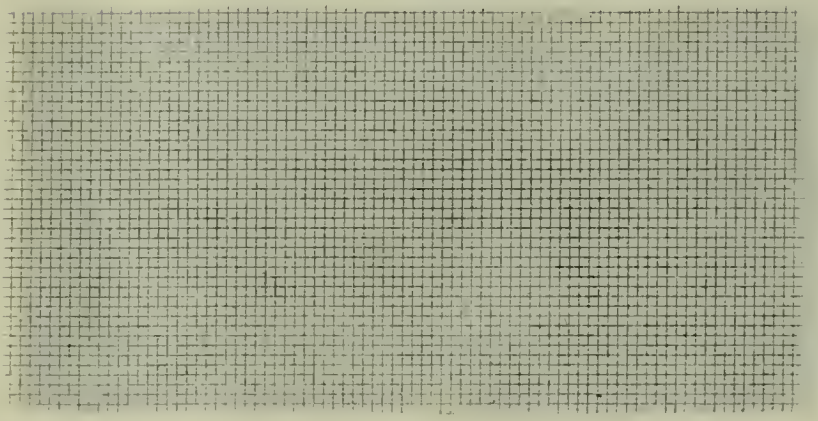
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

CHARTS PICKS TO THE ROUND

BLACK. WEFT. WHITE. WARP.

DESIGN No

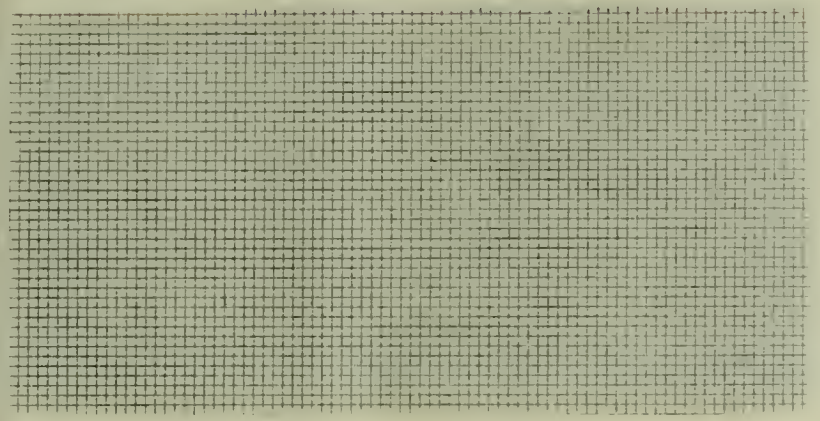
CHARTS PICKS TO THE ROUND

BLACK. WEFT. WHITE. WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND

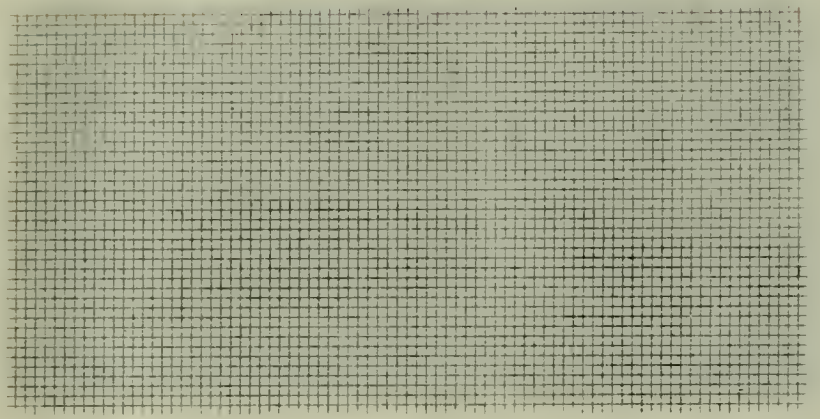
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

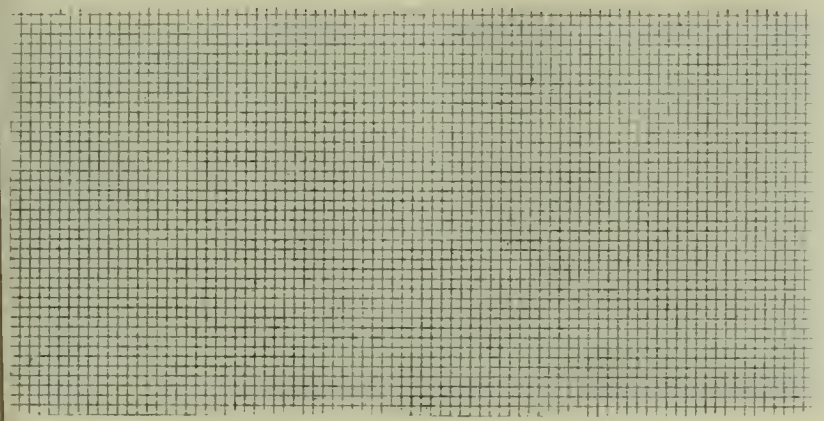
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

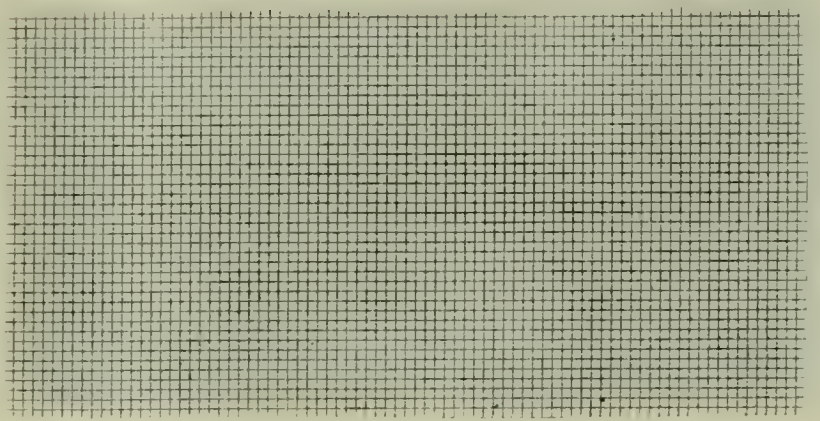
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE. WARP

DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK WEFT WHITE. WARP

DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK WEFT WHITE. WARP

DESIGN No

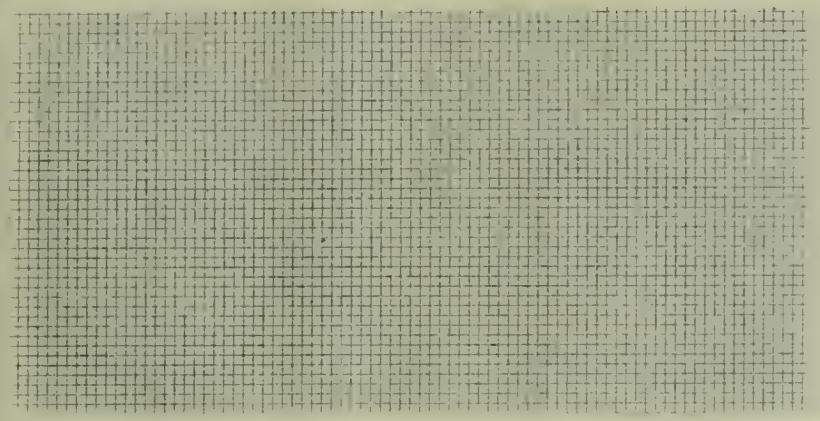
SHAFTS PICKS TO THE ROUND

BLACK WEFT WHITE. WARP

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

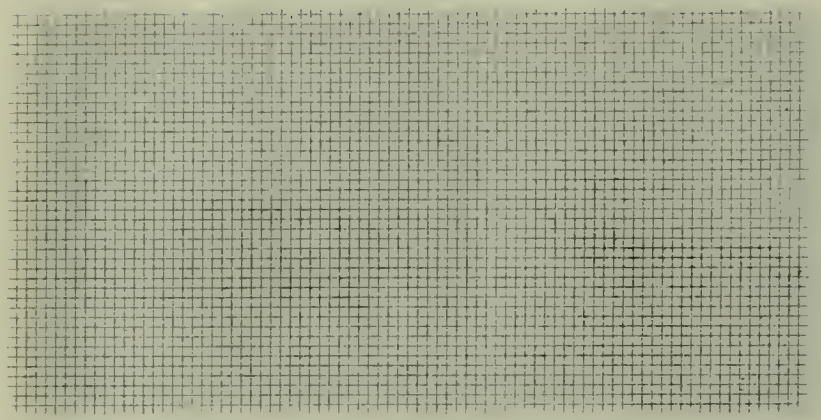
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

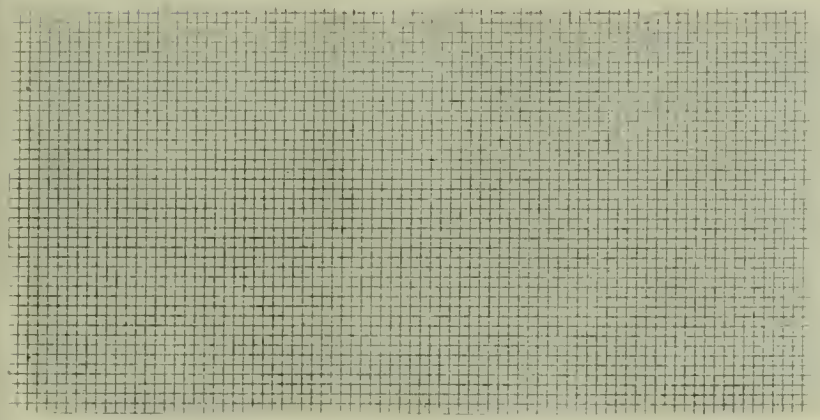
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

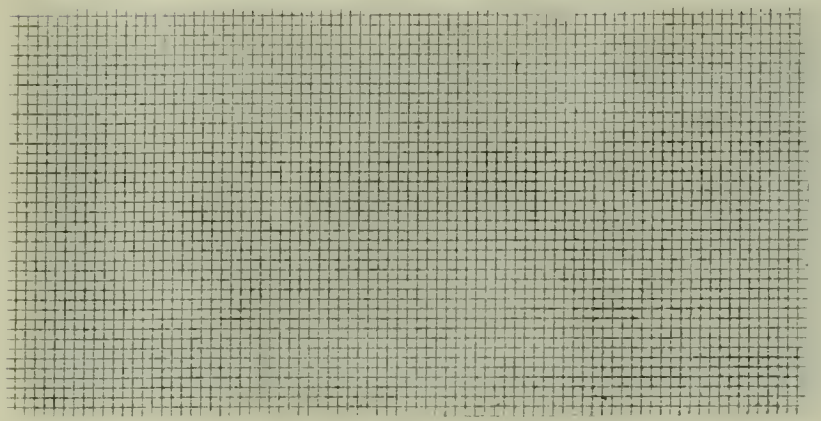
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE INCH

BLACK WEFT. WHITE WARP.

DESIGN No

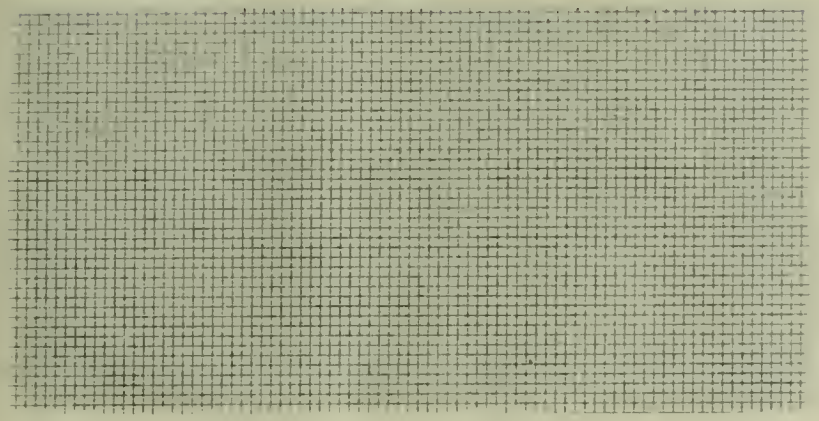
SHAFTS PICKS TO THE INCH

BLACK WEFT. WHITE WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

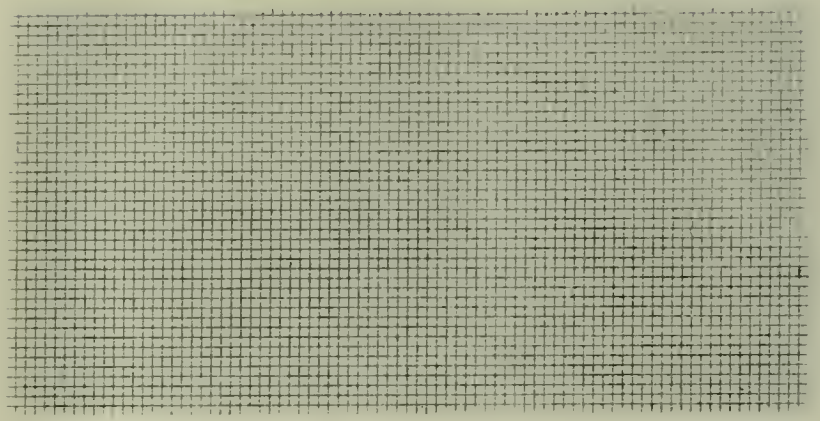
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

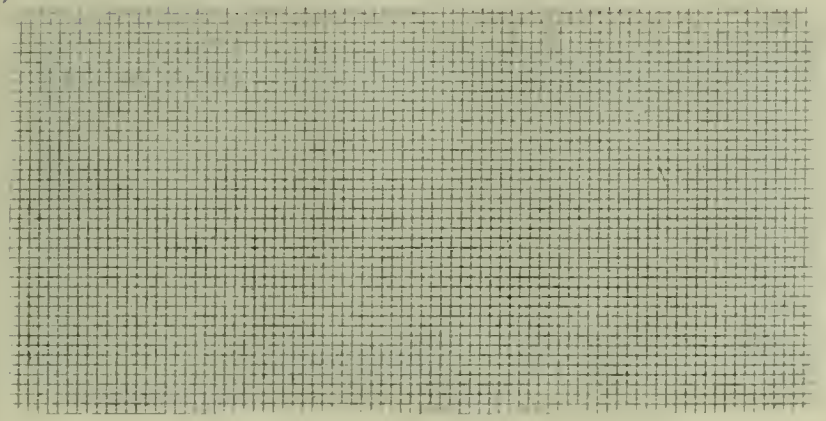
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN Nº

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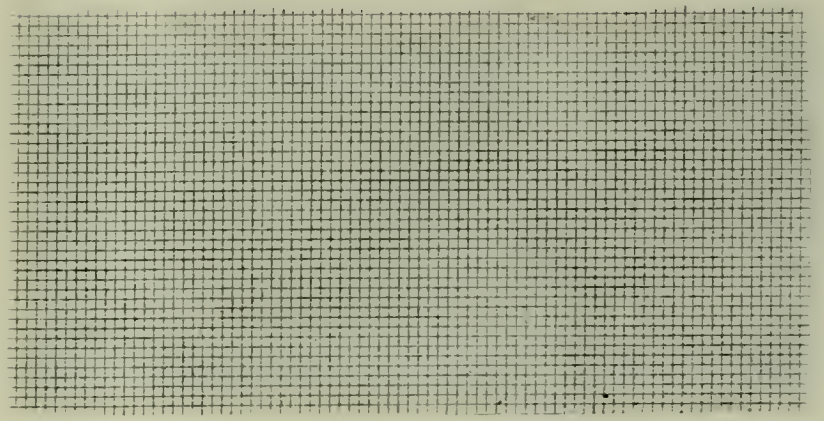
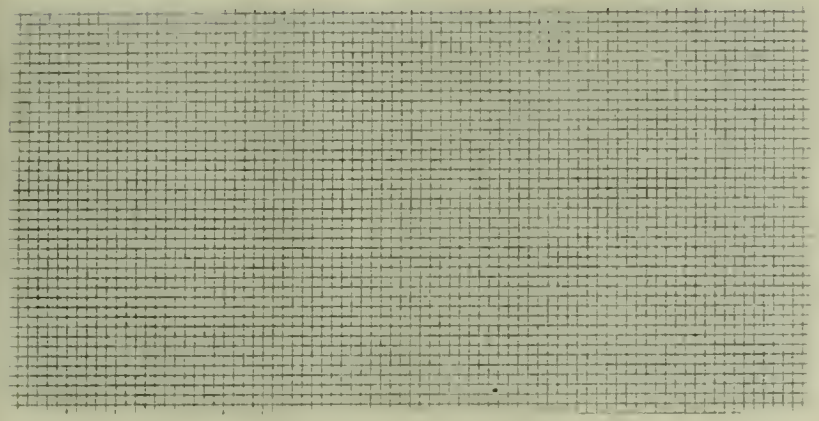
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

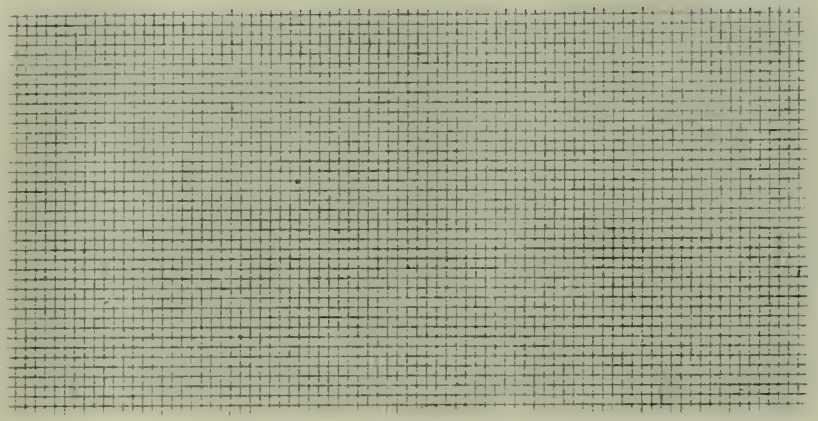
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

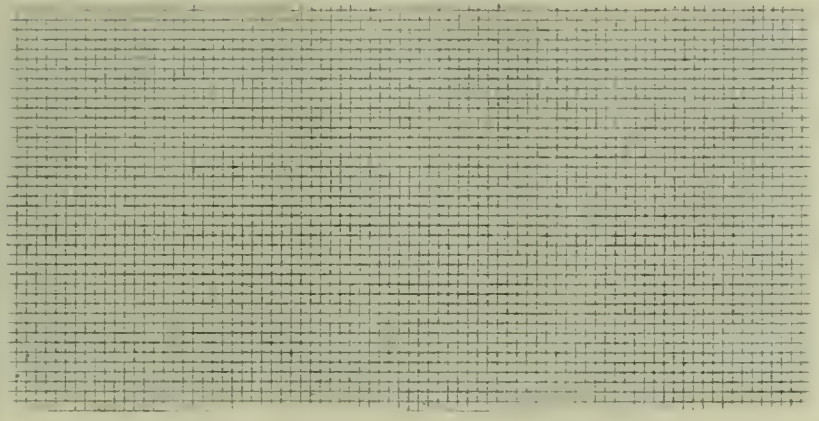
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

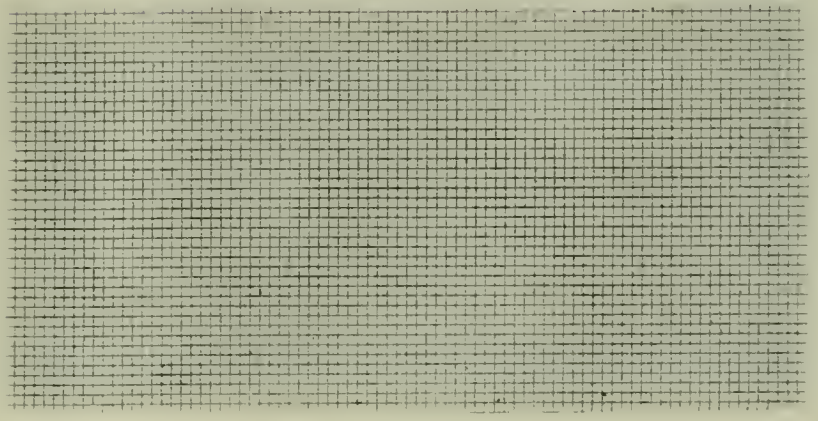
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK WEFT. WHITE WARP

DESIGN No

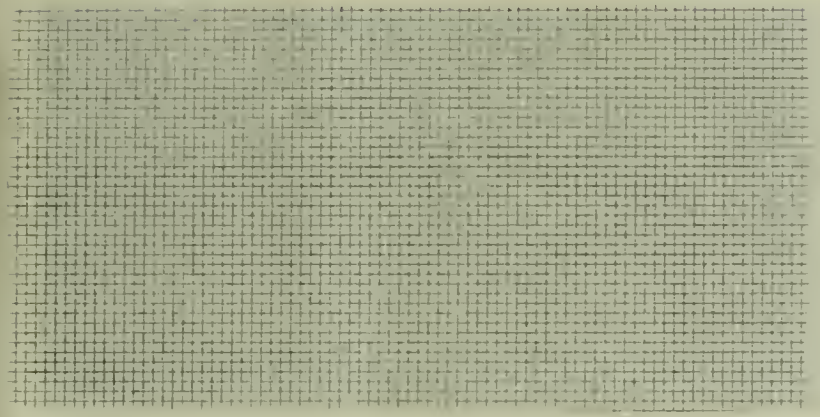
SHAFTS PICKS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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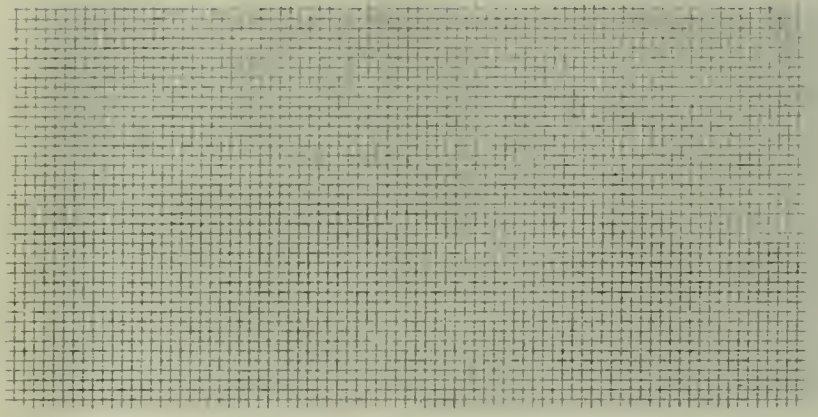
SHAFTS PICKS TO THE ROUND.

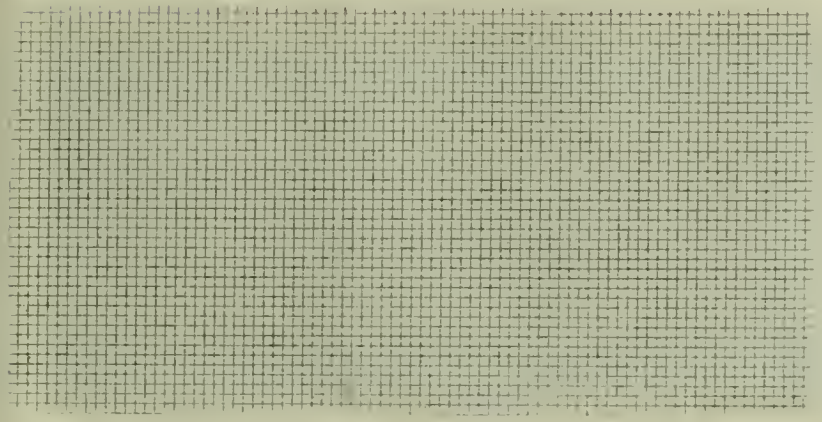
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

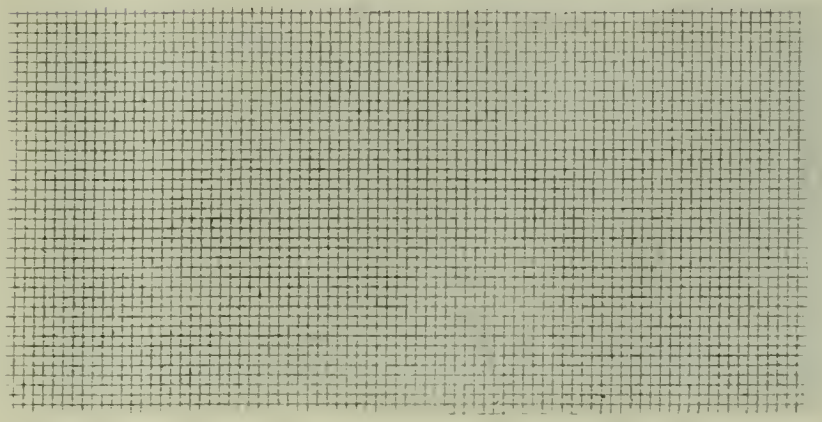
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

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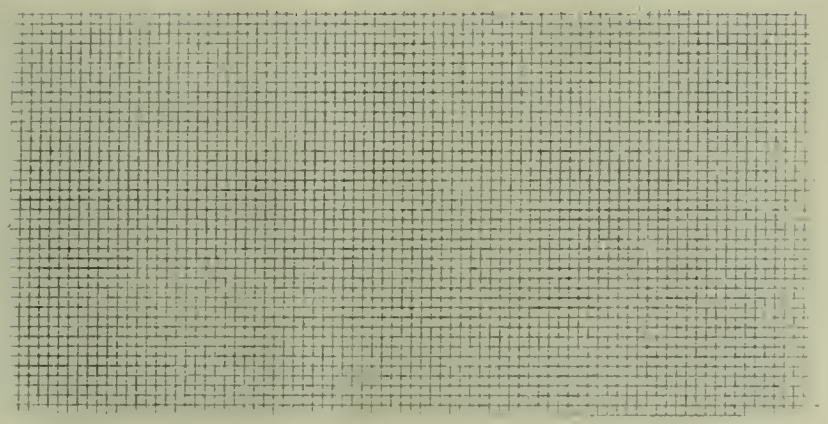
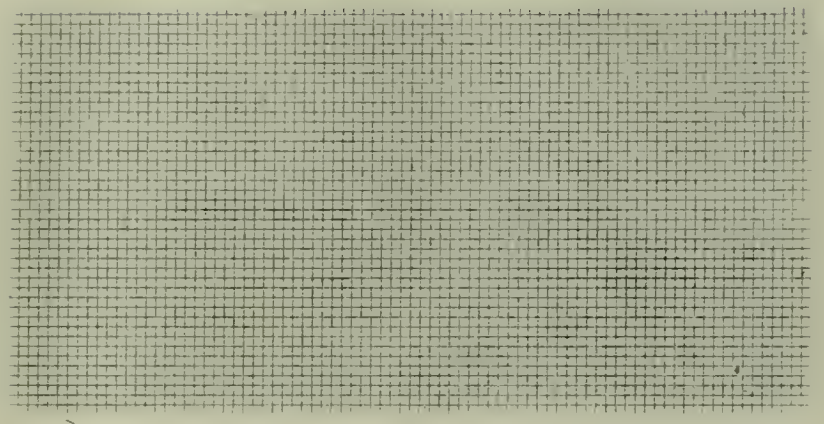


DESIGN Nº

SHAFTS PICKS TO THE ROUND.

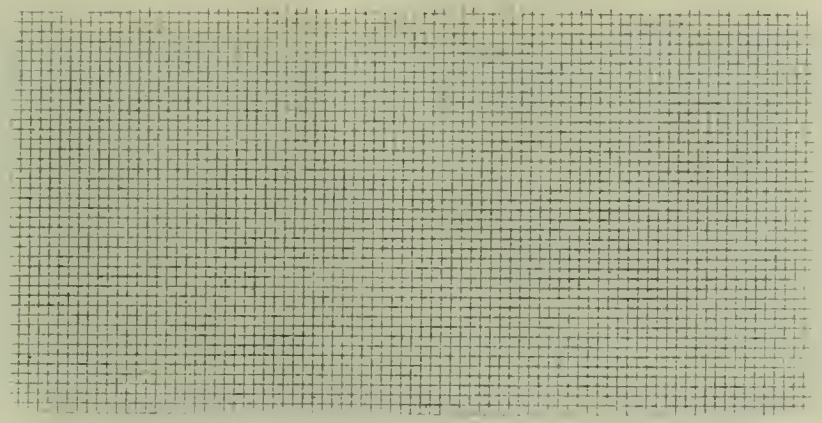
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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SHAFTS PICKS TO THE ROUND.

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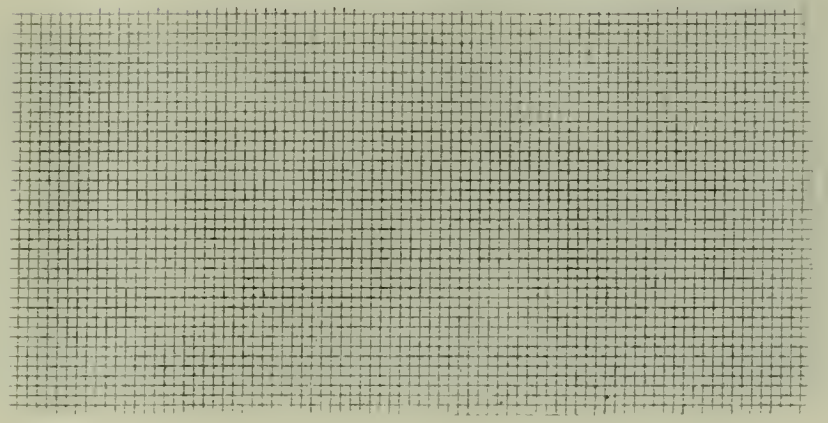

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

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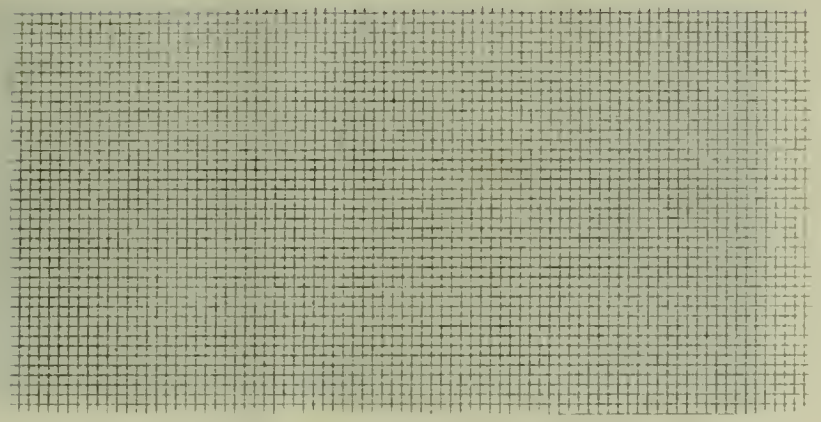

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SHAFTS PICKS TO THE ROUND.

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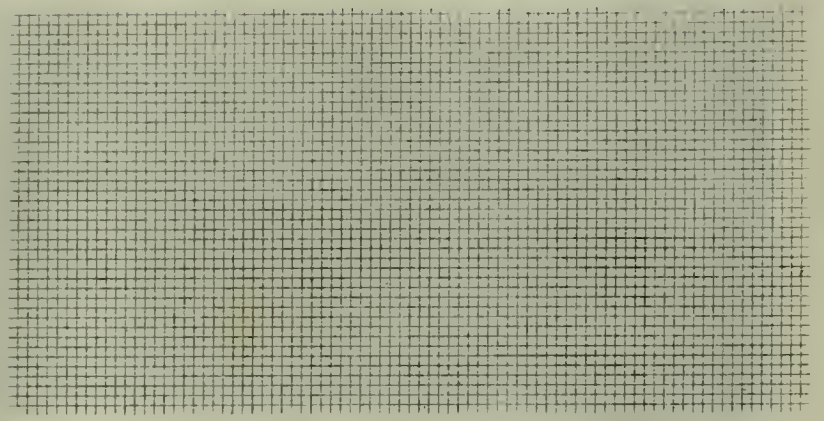

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

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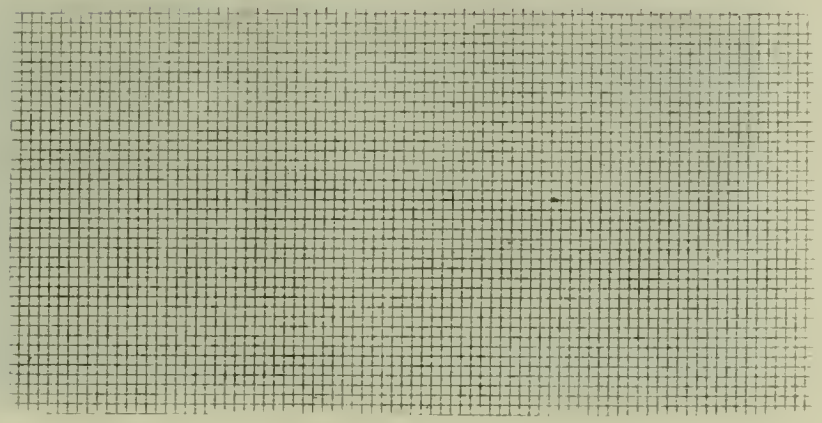

DESIGN Nº

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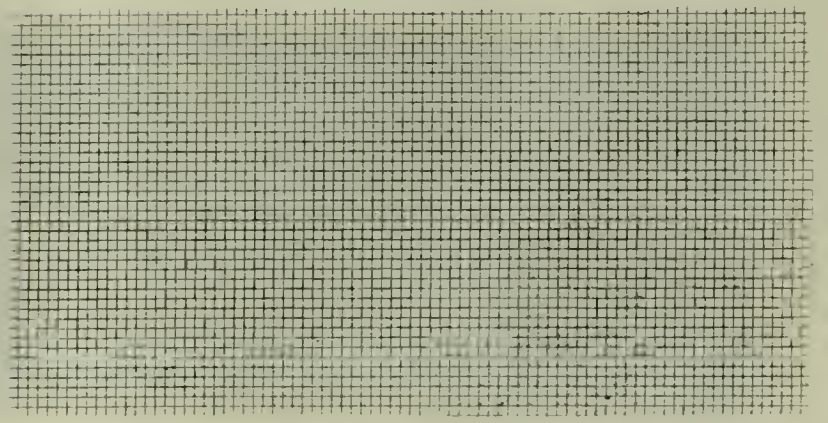

DESIGN No 9

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN No 10

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND

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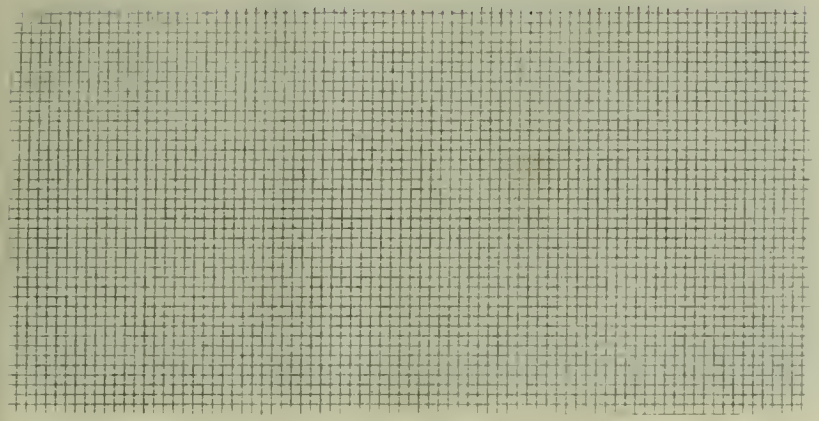

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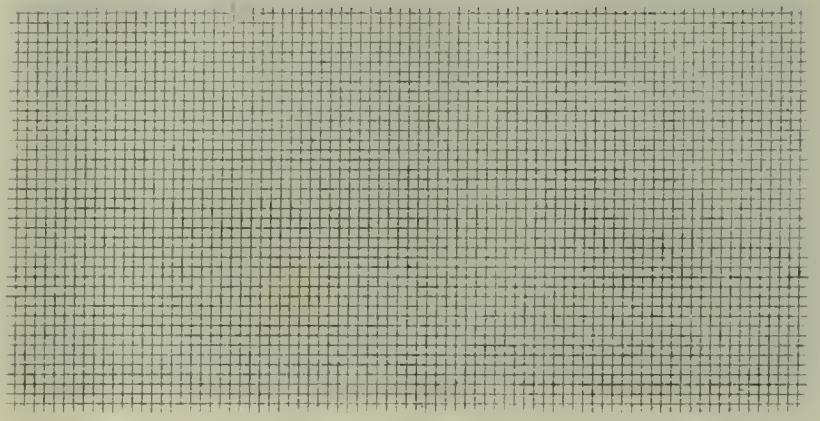

DESIGN Nº

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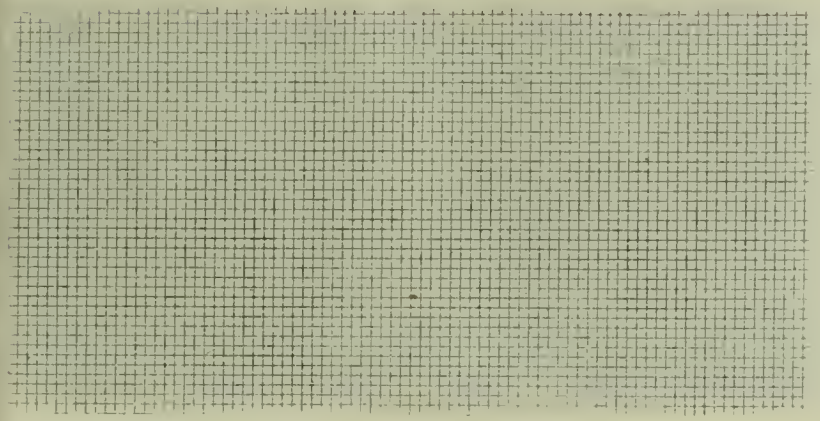

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

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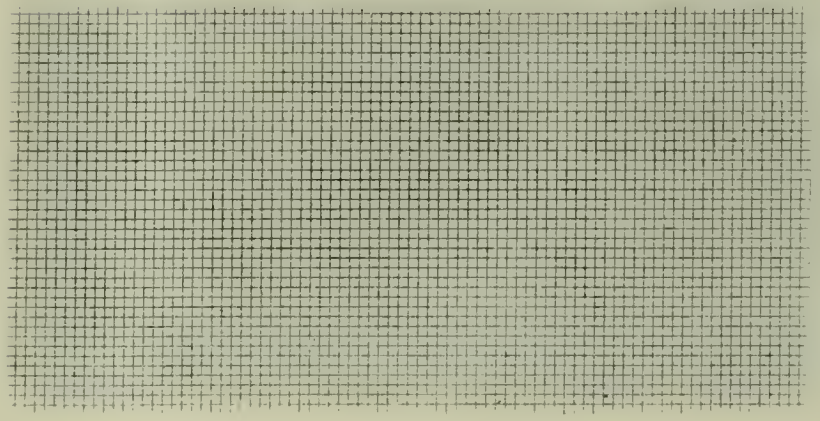

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

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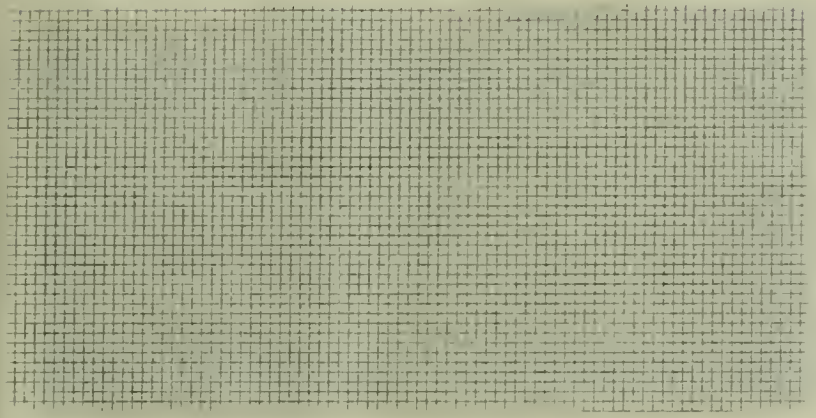

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

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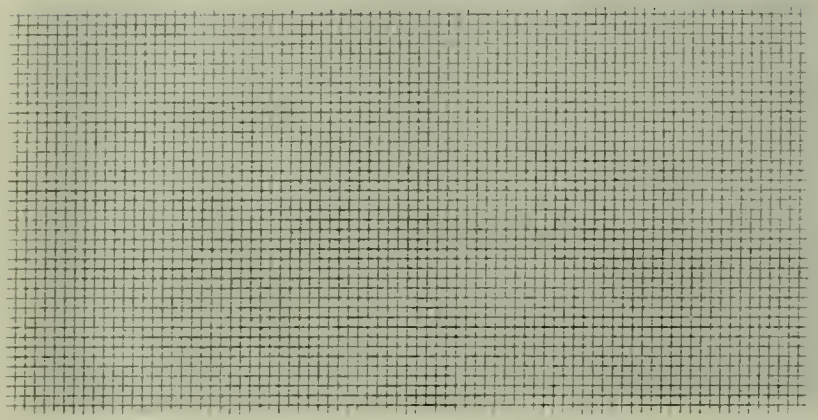

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

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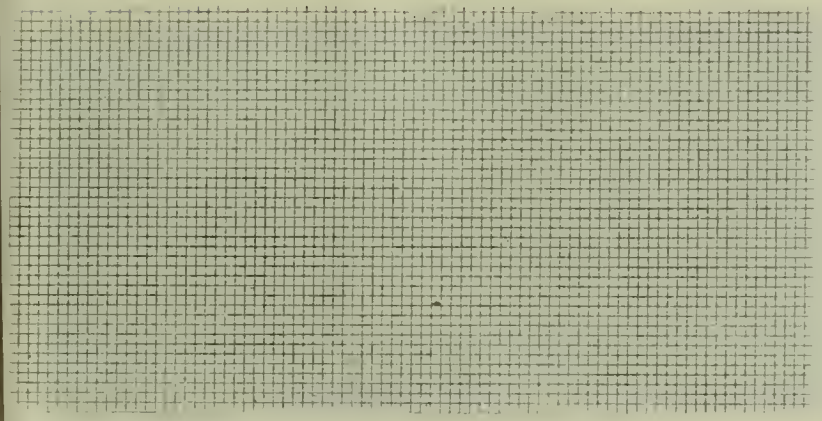
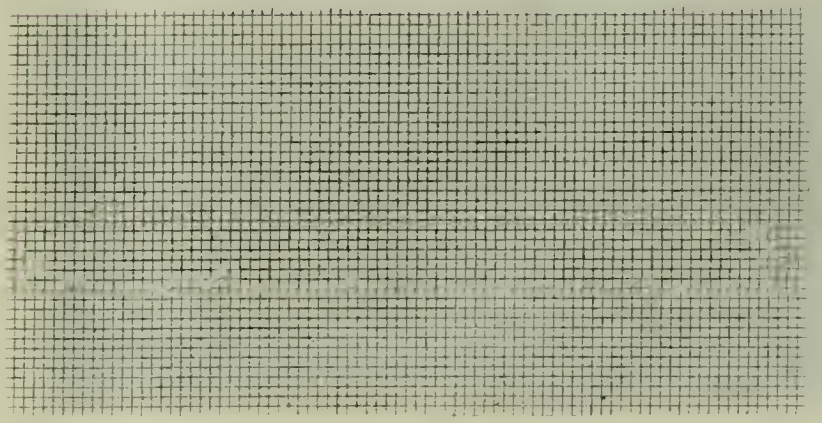


DESIGN Nº

SHAFTS PICKS TO THE ROUND.

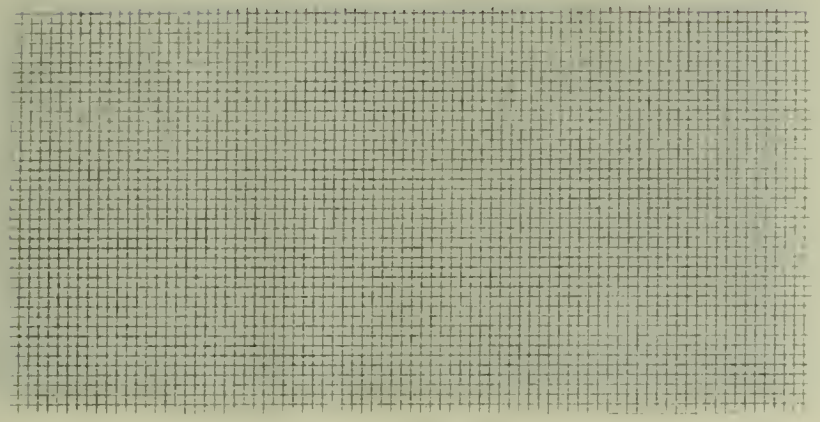
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

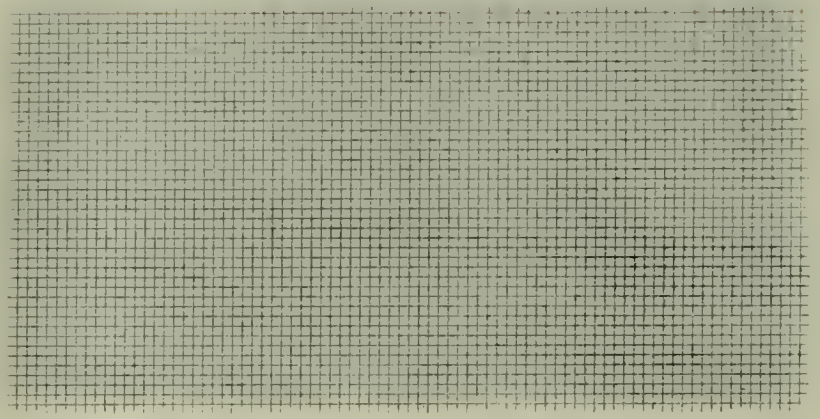
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

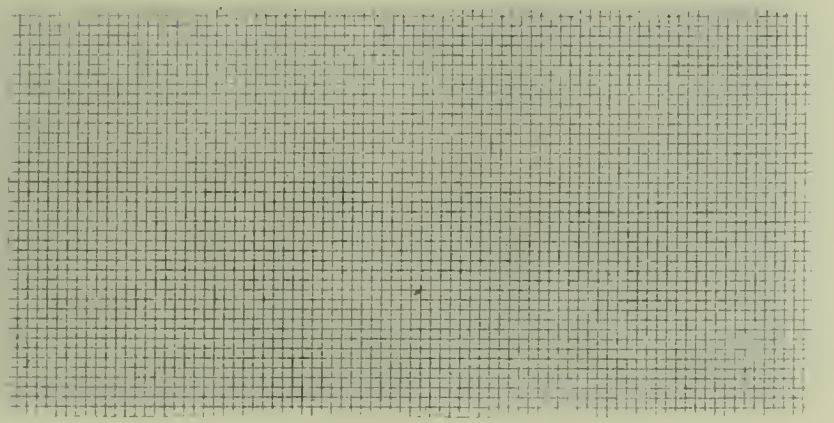
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

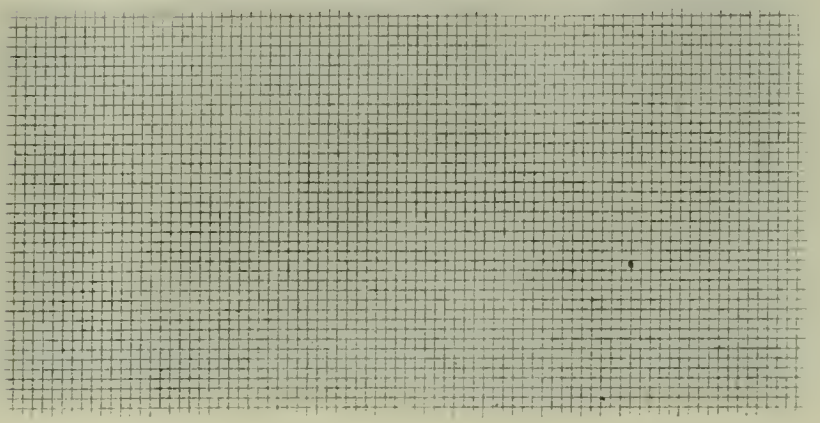
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

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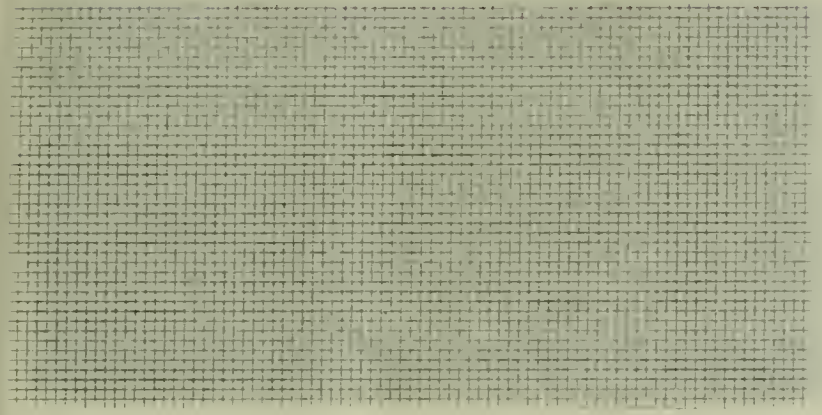

DESIGN Nº

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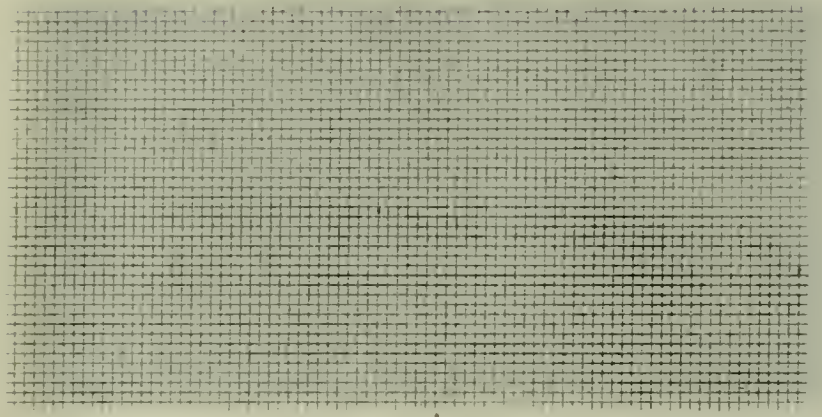
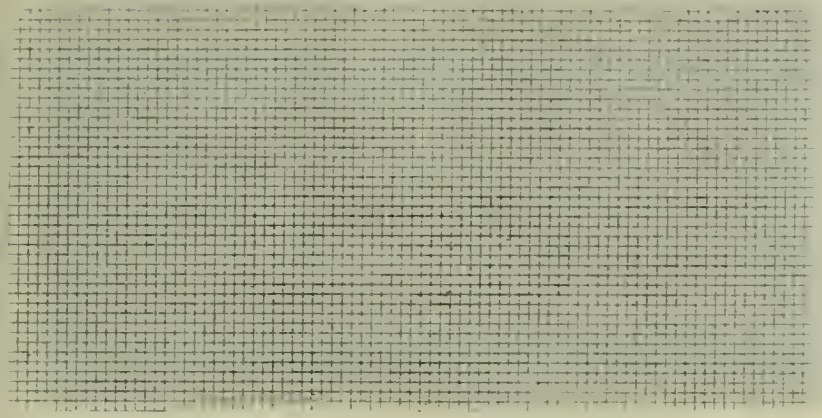
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

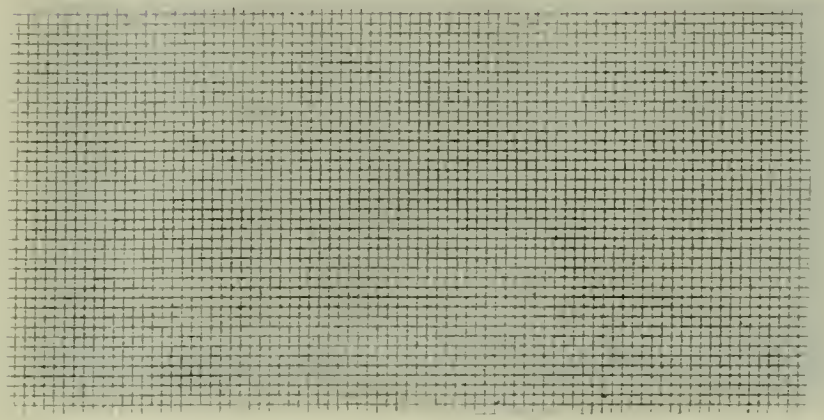
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN No

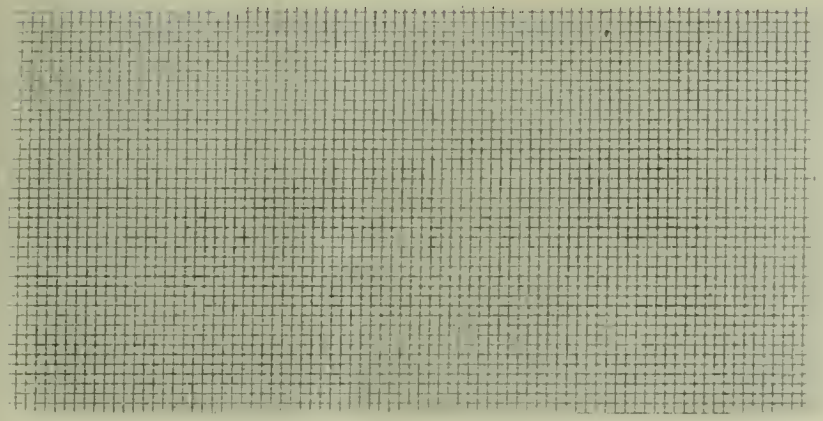
SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

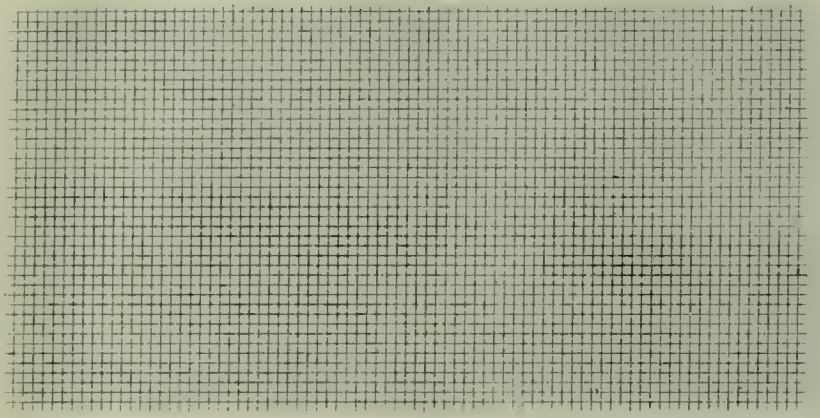
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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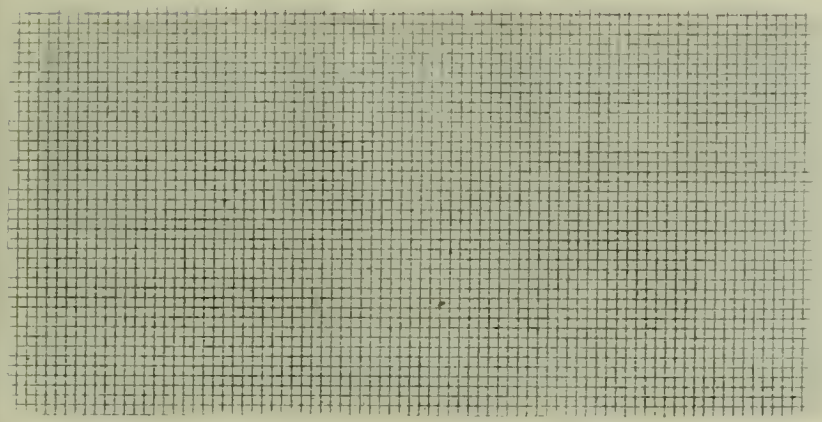
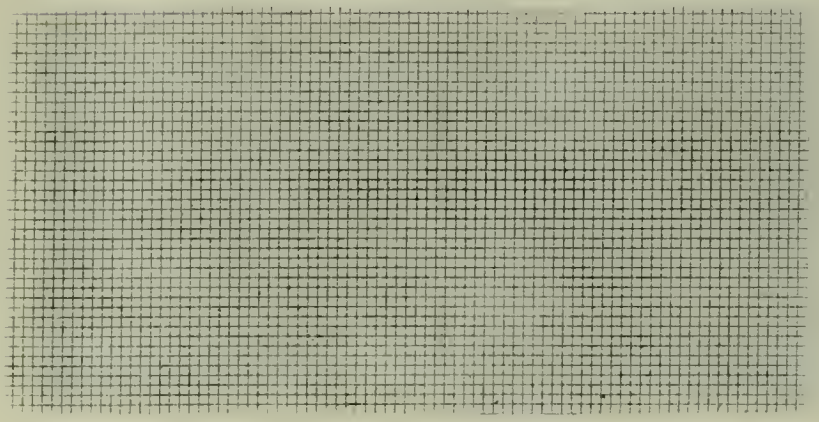
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN No

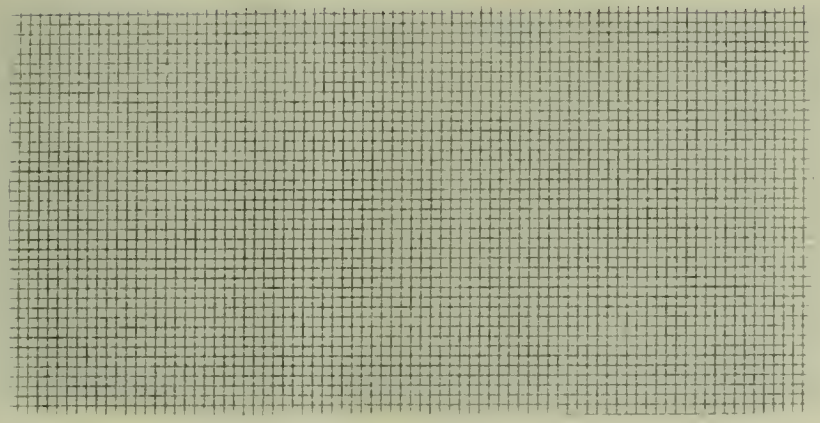
SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

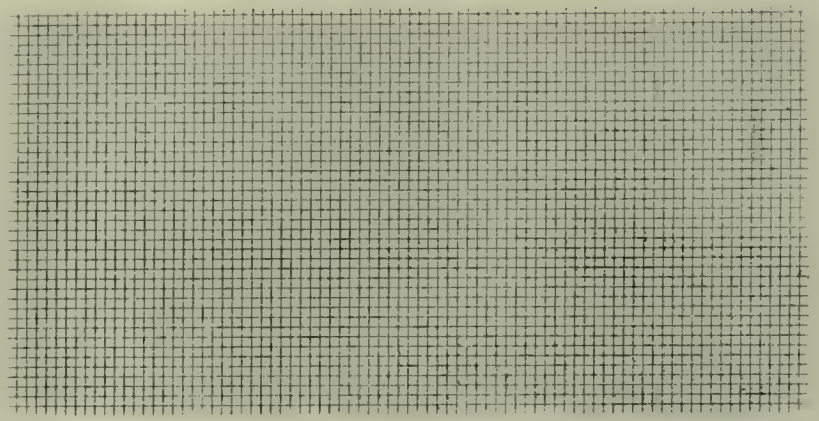
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

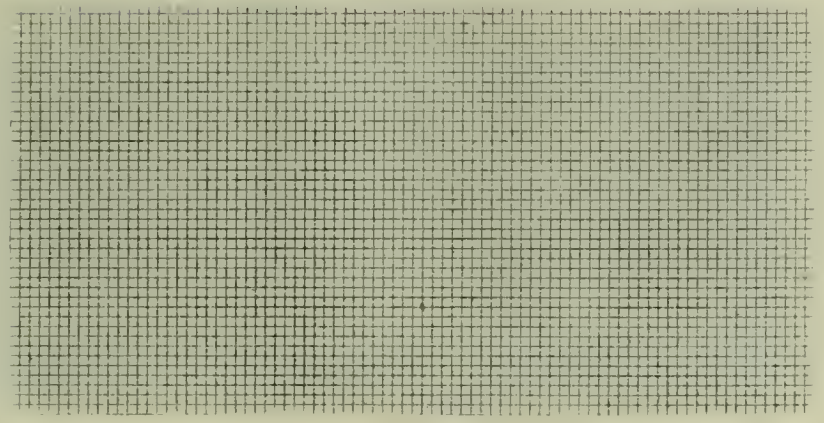
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

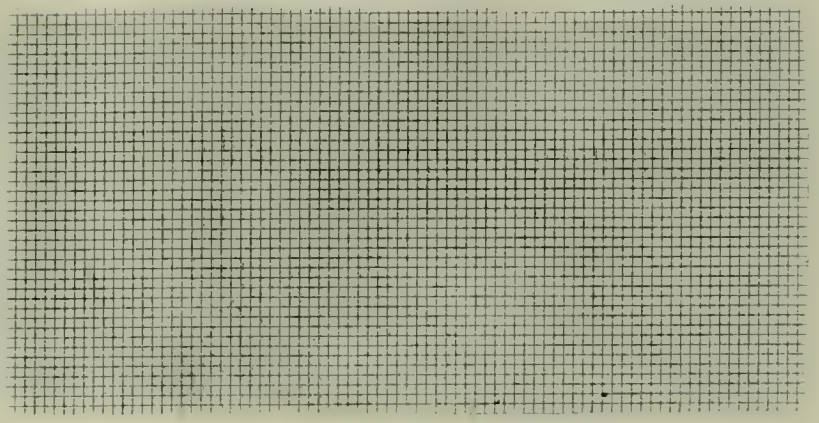
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

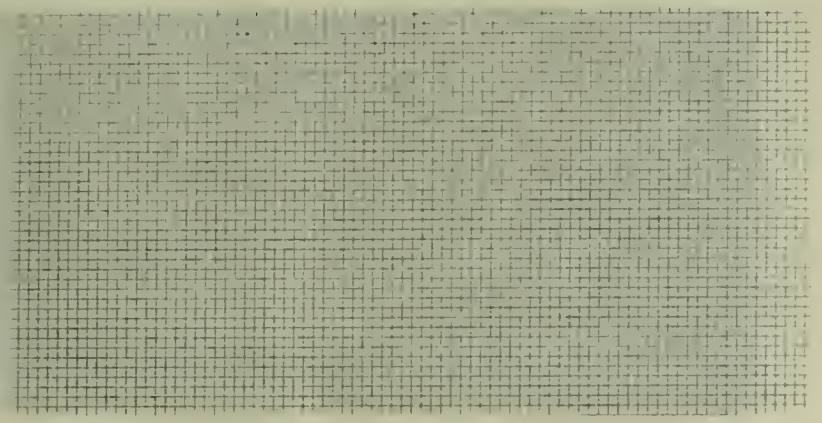
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

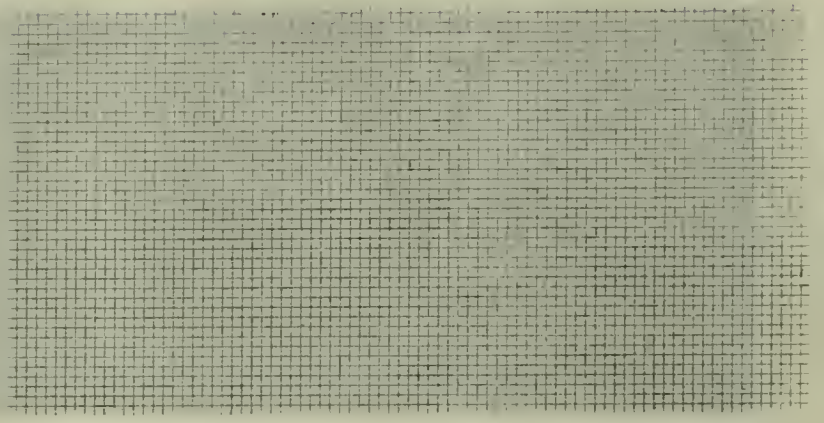
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

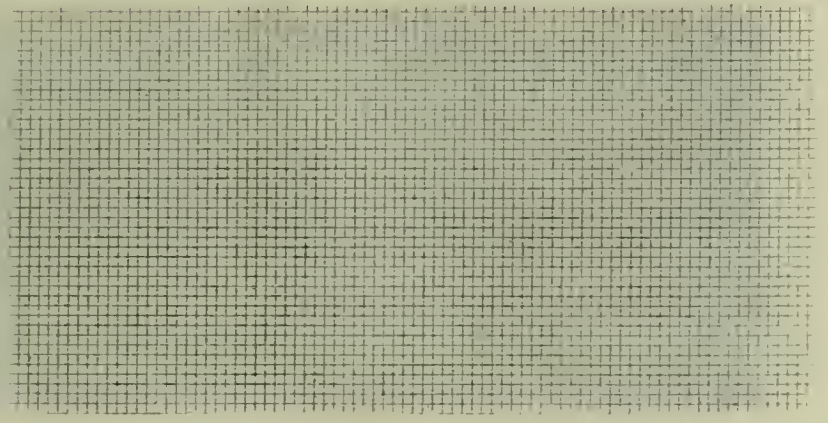
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

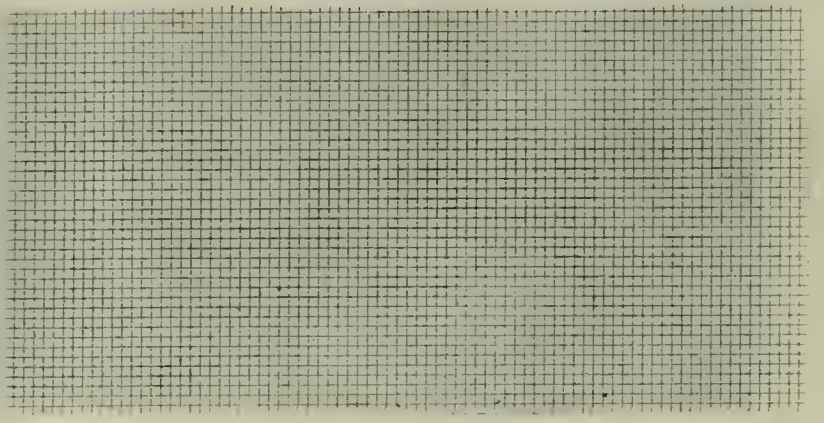
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

PICKS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN No

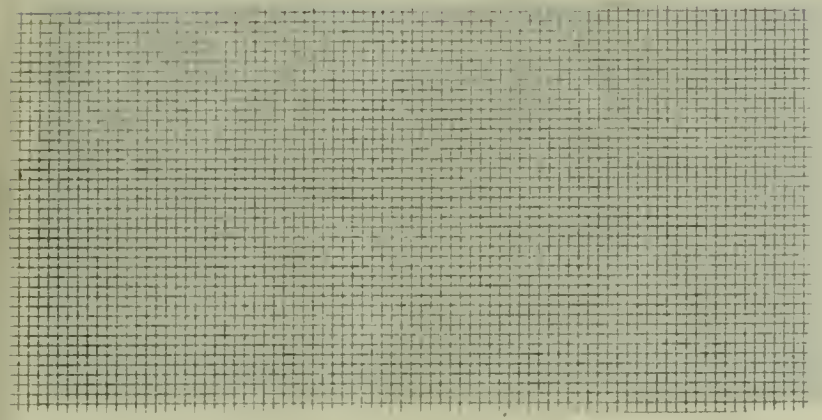
PICKS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

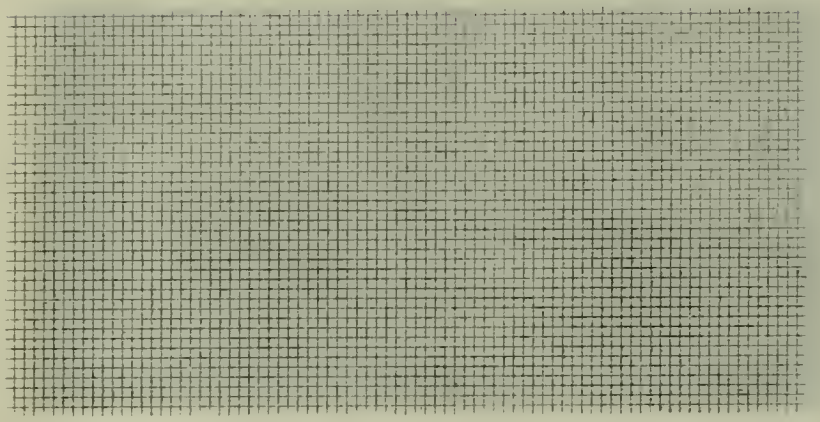
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

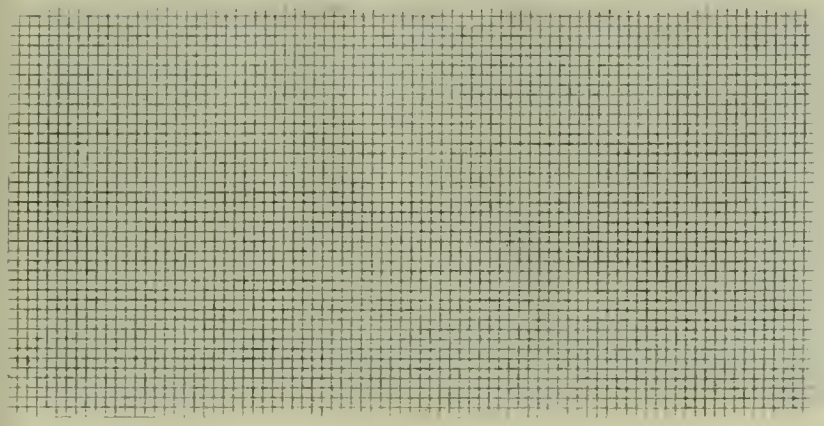
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK. WEFT. WHITE, WARP.



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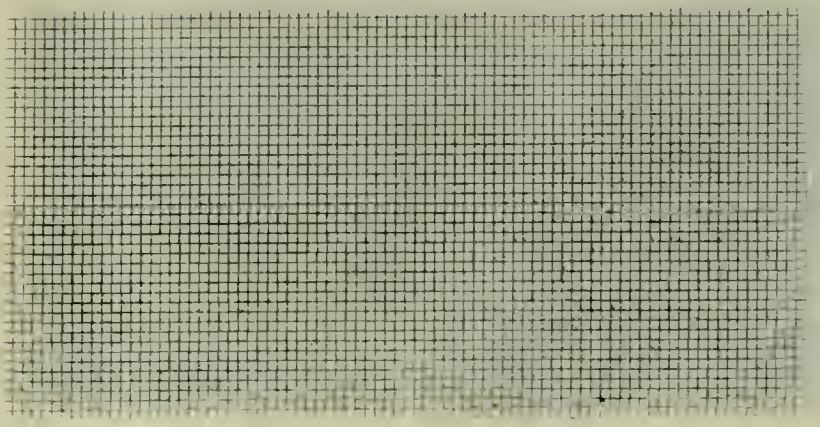
BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK. WEFT. WHITE. WARP.

DESIGN No

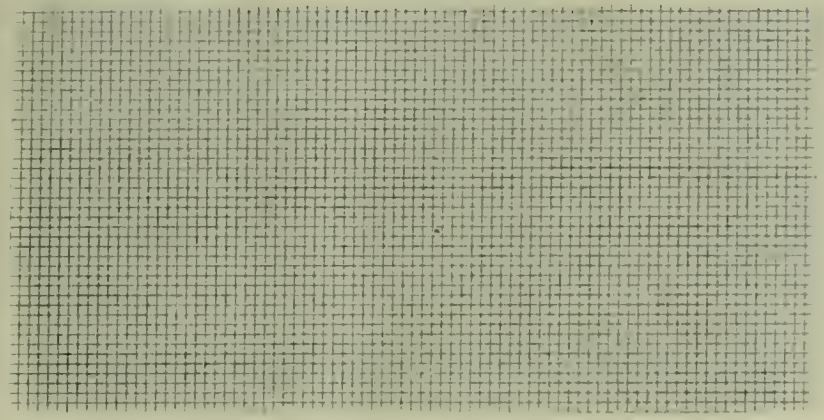
SHAFTS PICKS TO THE ROUND

BLACK. WEFT. WHITE. WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

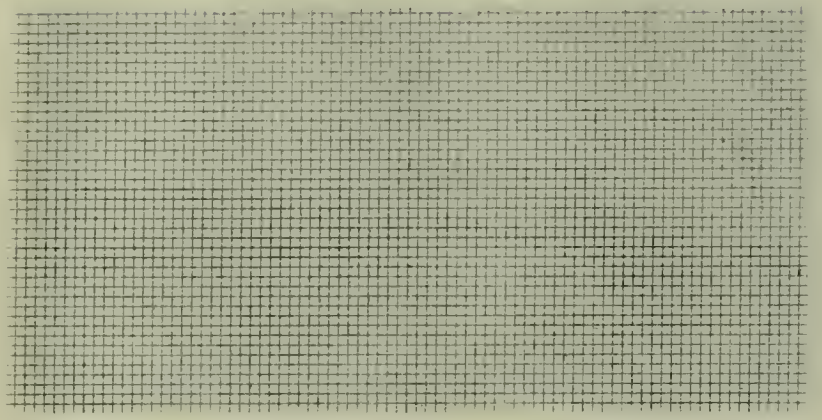
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

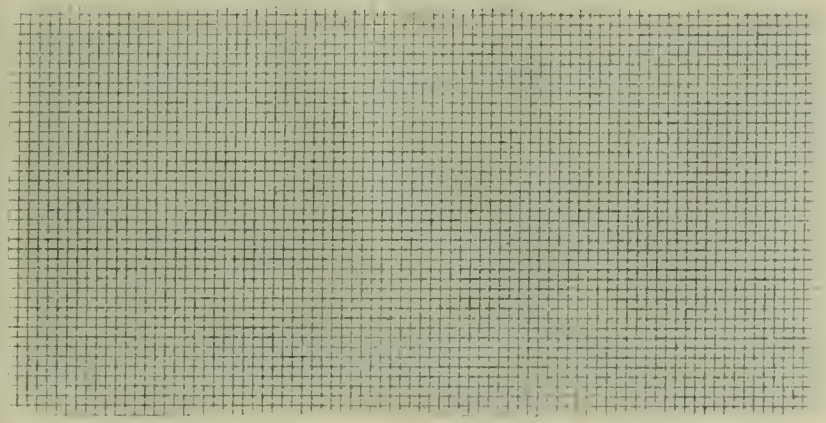
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

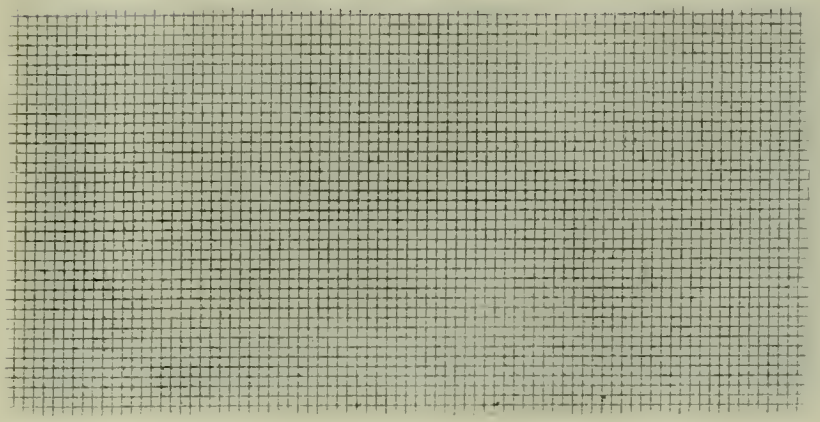
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE POUND

BLACK WEFT WHITE WARP

DESIGN No

SHAFTS PICKS TO THE POUND

BLACK WEFT WHITE WARP

DESIGN No

SHAFTS PICKS TO THE POUND

BLACK WEFT WHITE WARP

DESIGN No

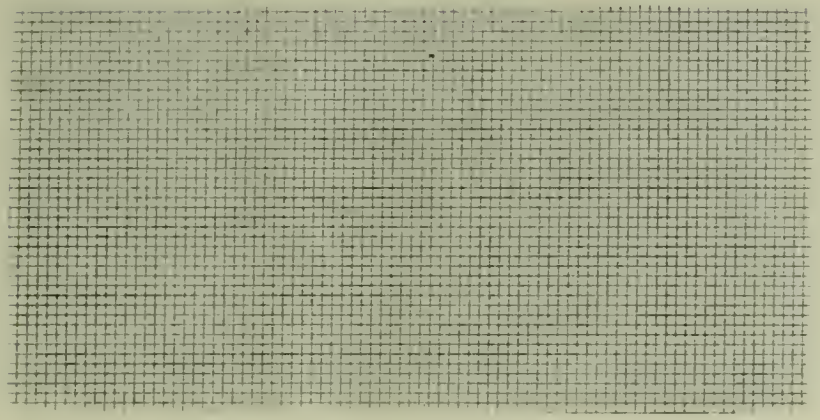
SHAFTS PICKS TO THE POUND

BLACK WEFT WHITE WARP

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

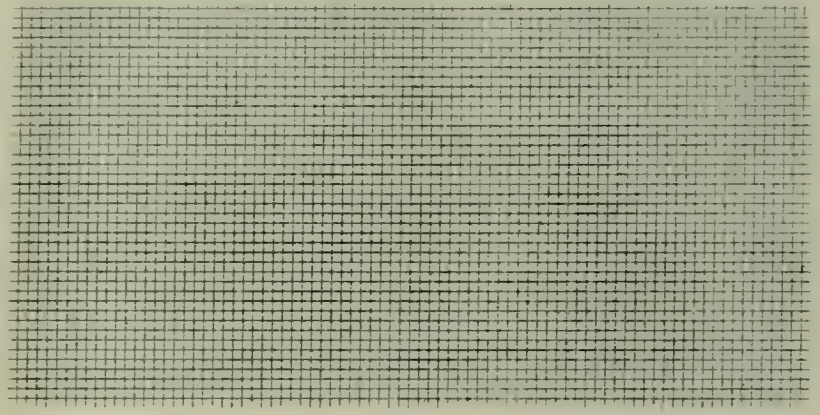
BLACK. WEFT. WHITE. WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

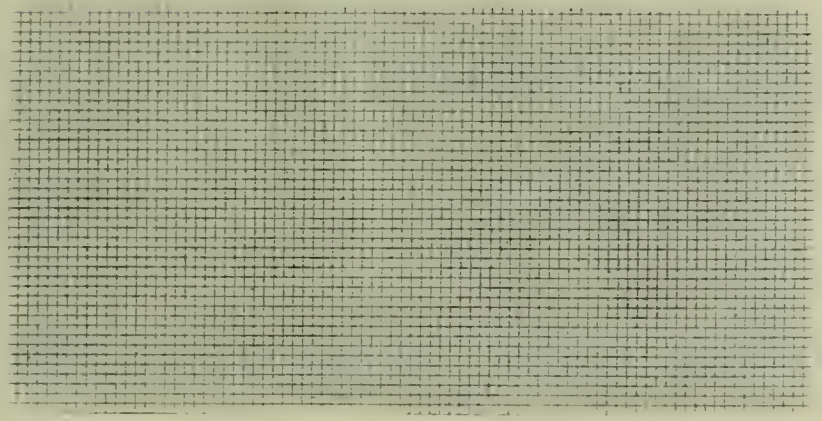
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

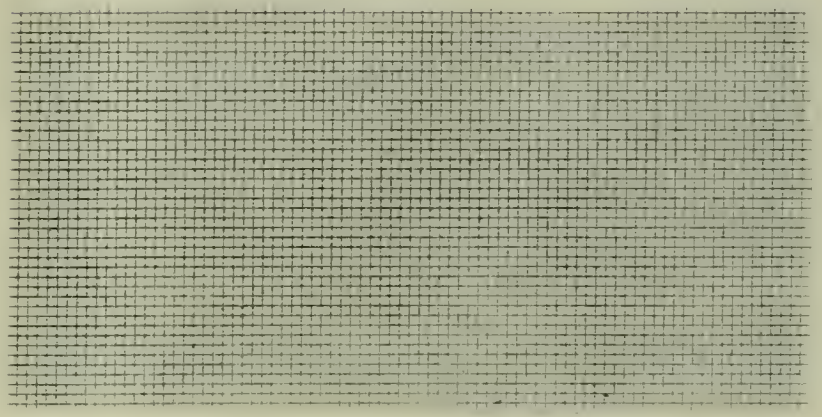
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN No

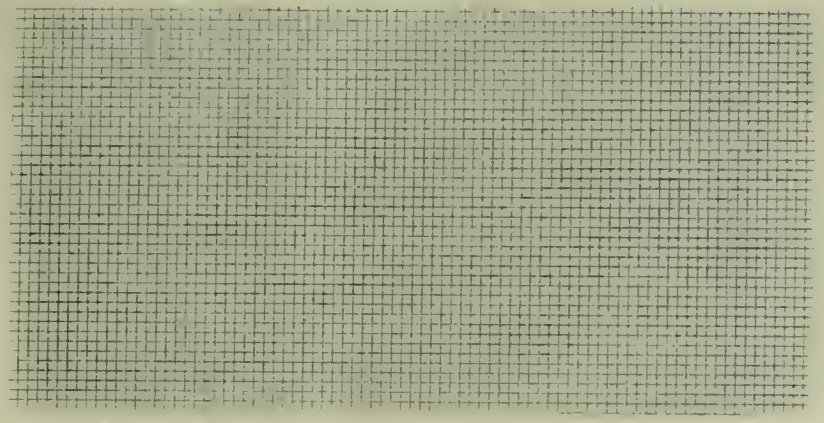
SHAFTS PICKS TO THE ROUND

BLACK WEFT. WHITE WARP

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

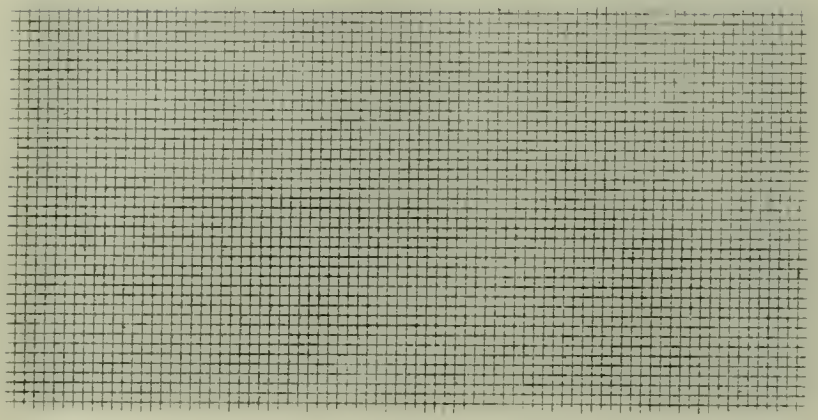
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

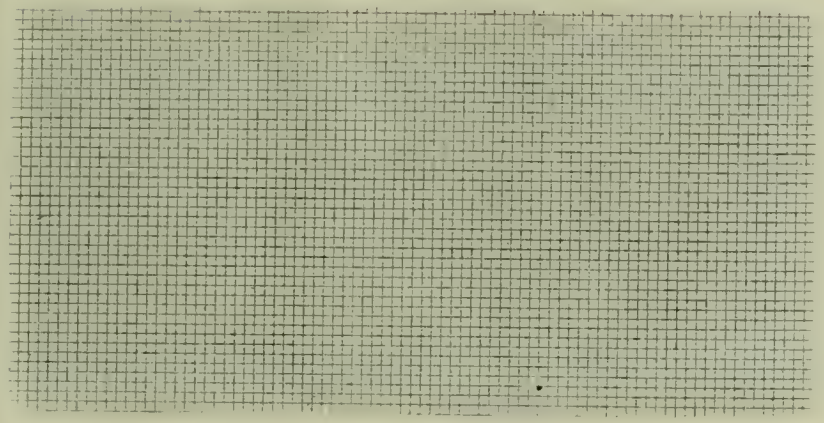
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

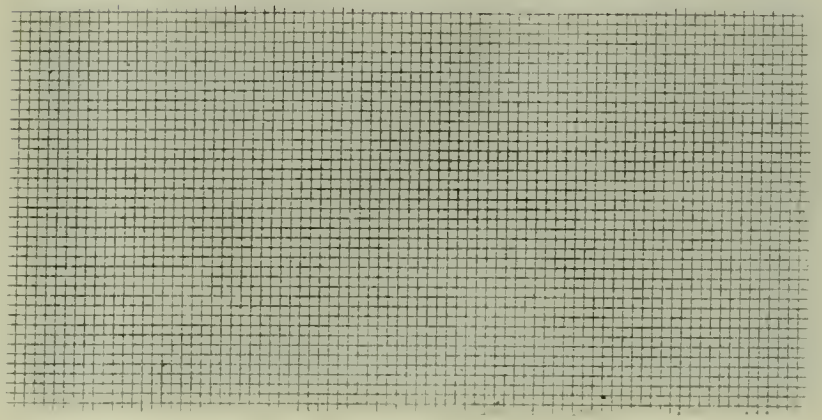
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

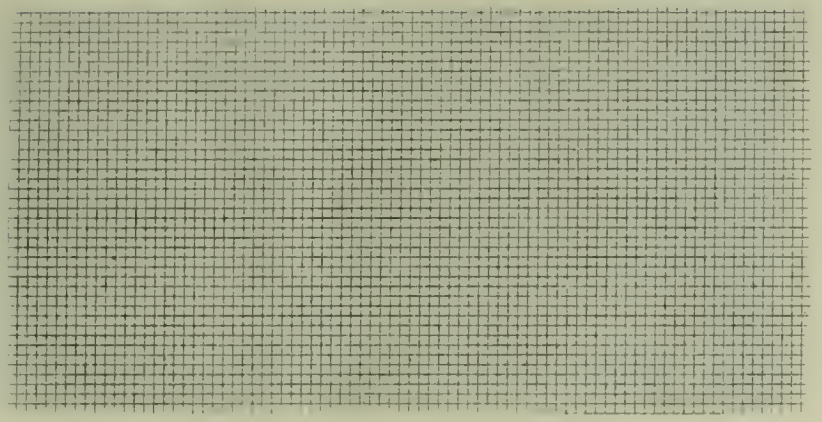
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

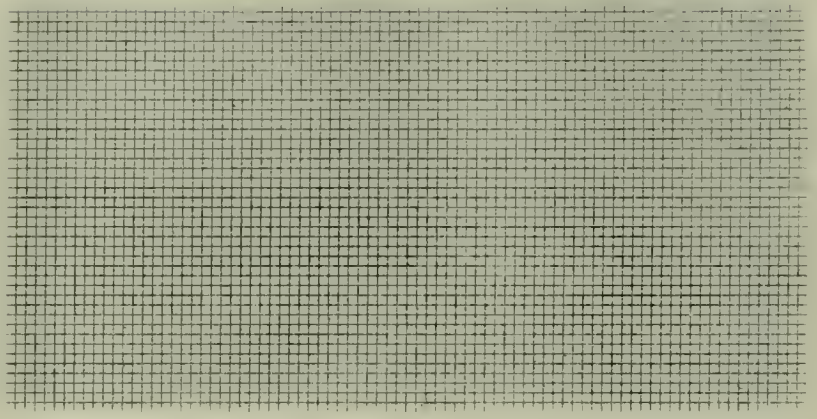
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

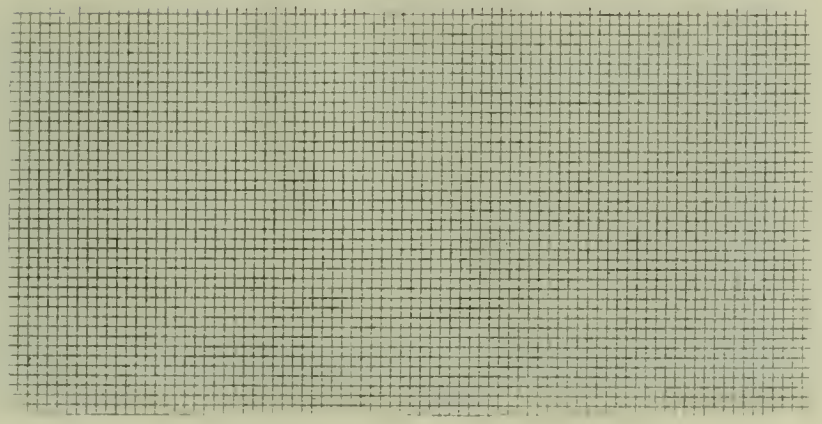
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

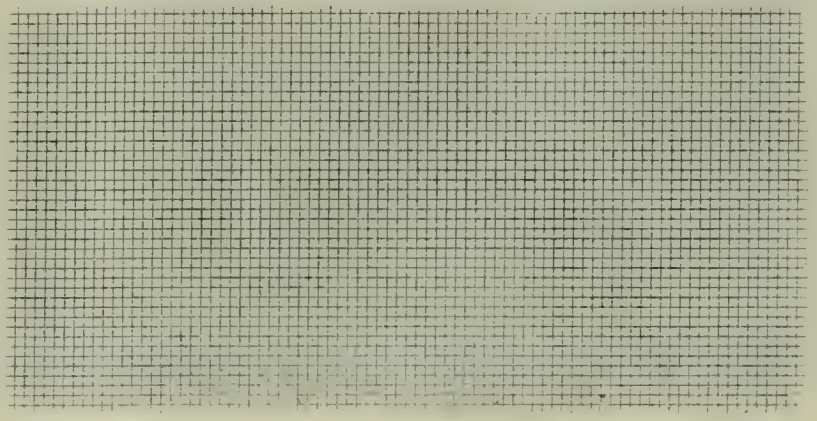
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK. WEFT. WHITE. WARP

DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK. WEFT. WHITE. WARP

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SHAFTS PICKS TO THE ROUND

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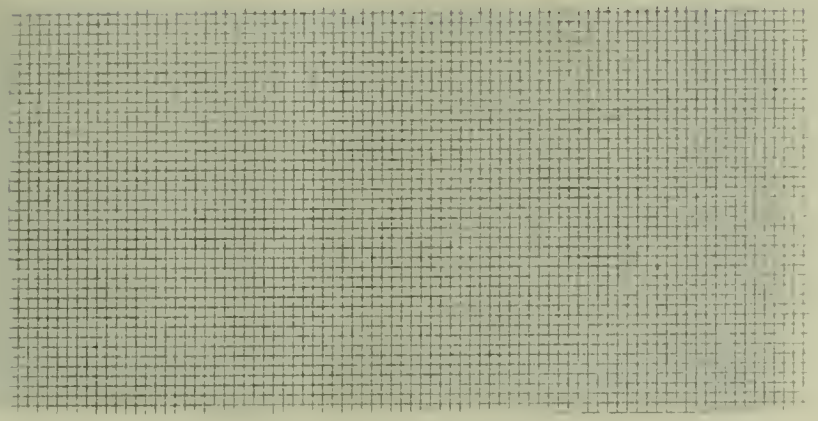
SHAFTS PICKS TO THE ROUND

BLACK. WEFT. WHITE. WARP

DESIGN Nº

SHAFTS PICKS TO THE ROUND

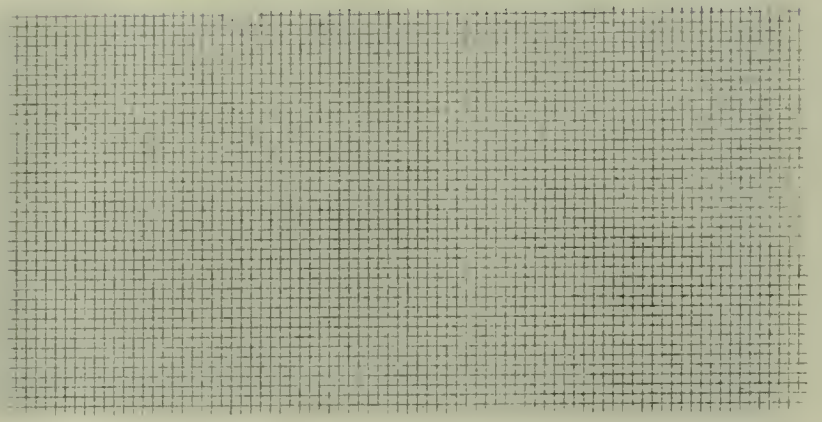
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

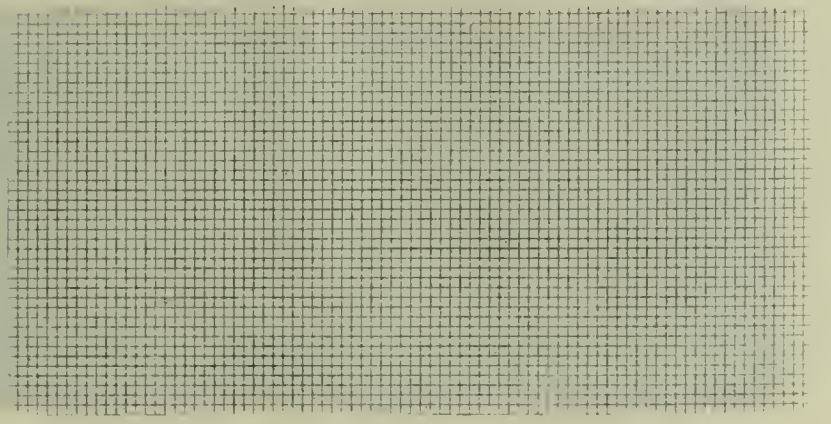
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

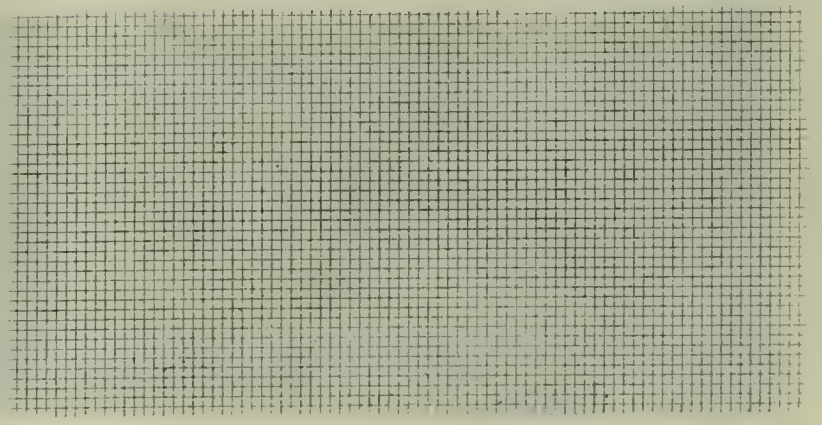
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

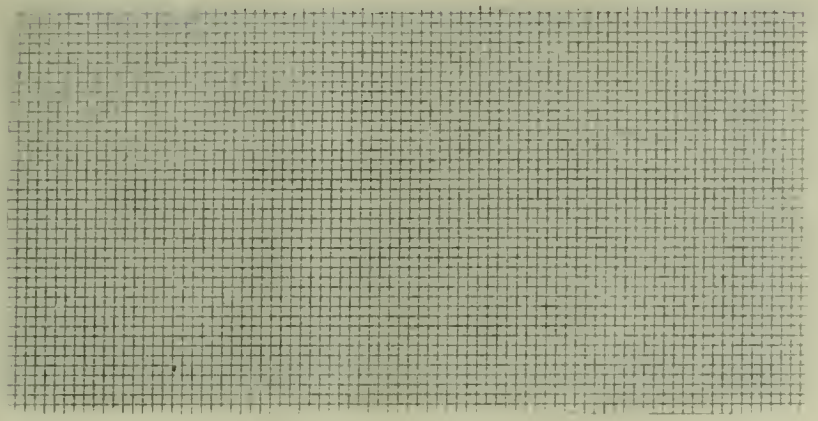
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

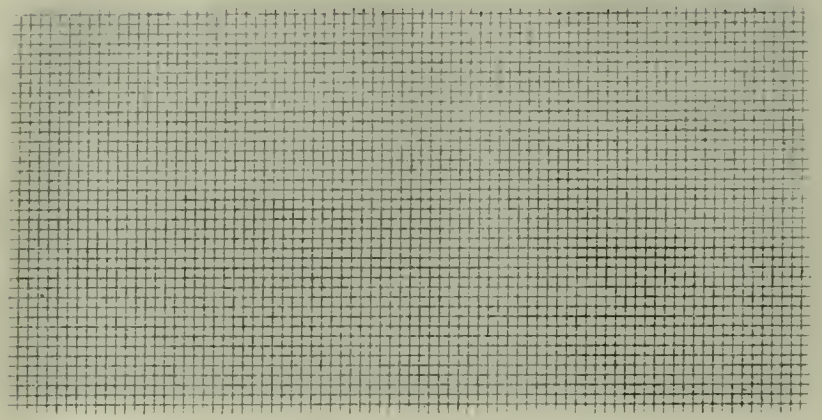
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

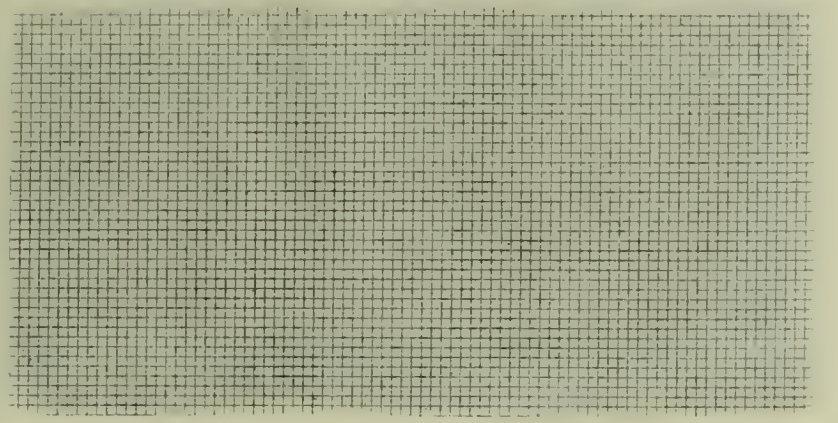
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

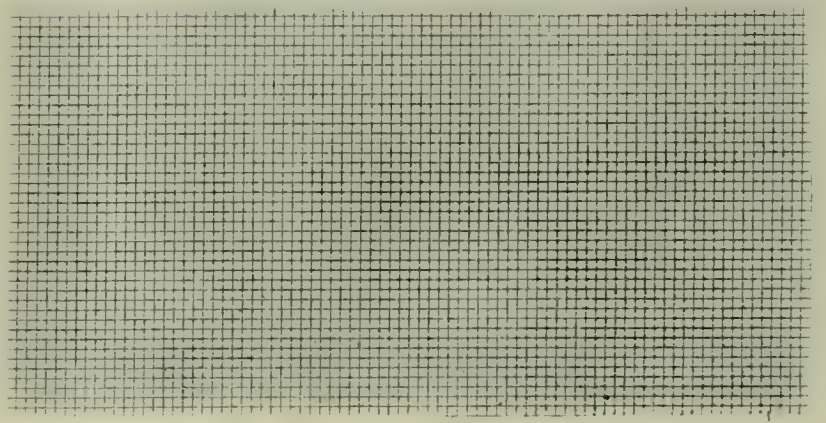
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS TURNS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN No

SHAFTS TURNS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN No

SHAFTS TURNS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN No

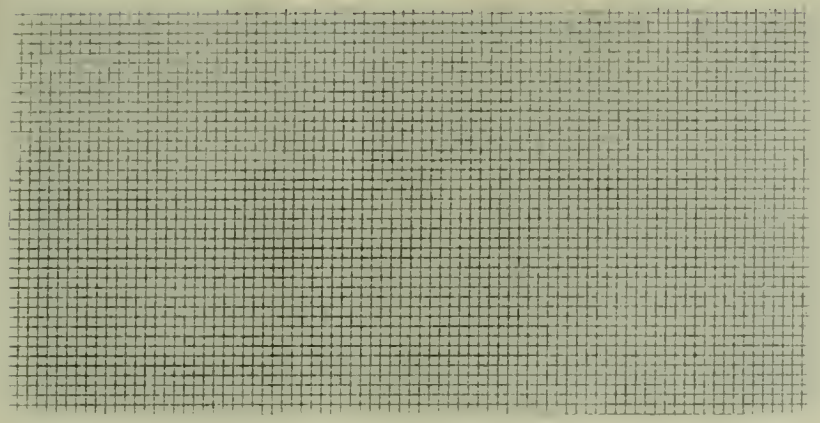
SHAFTS TURNS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND

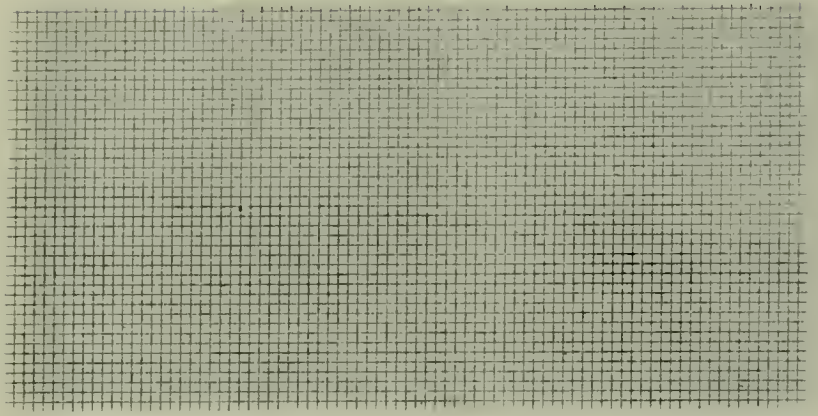
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

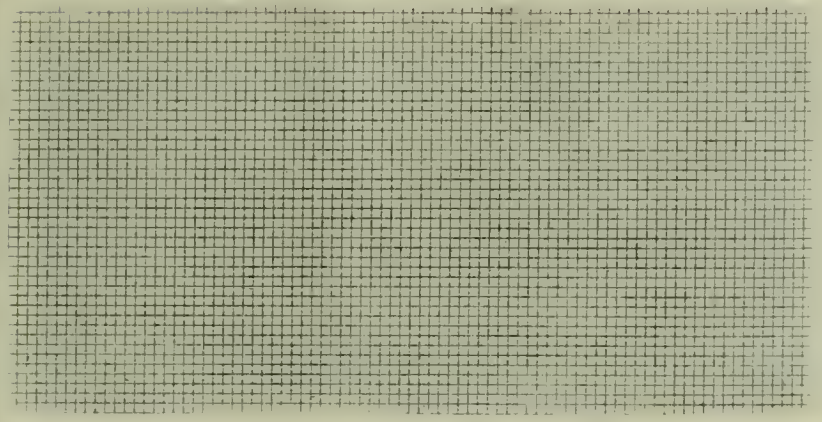
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

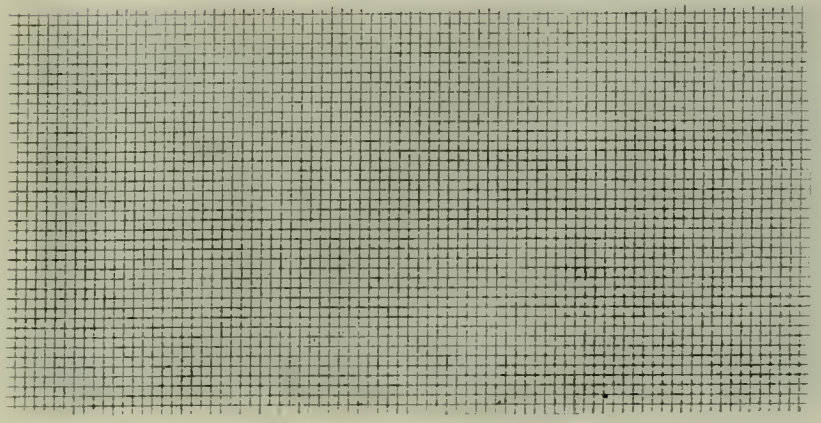
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN No

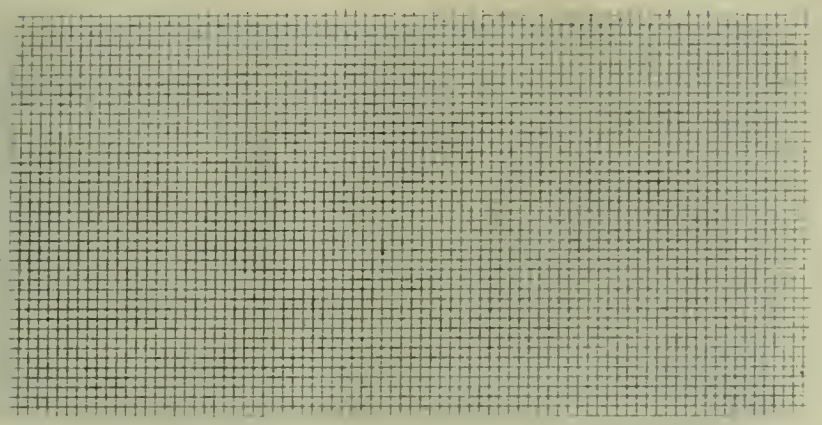
SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

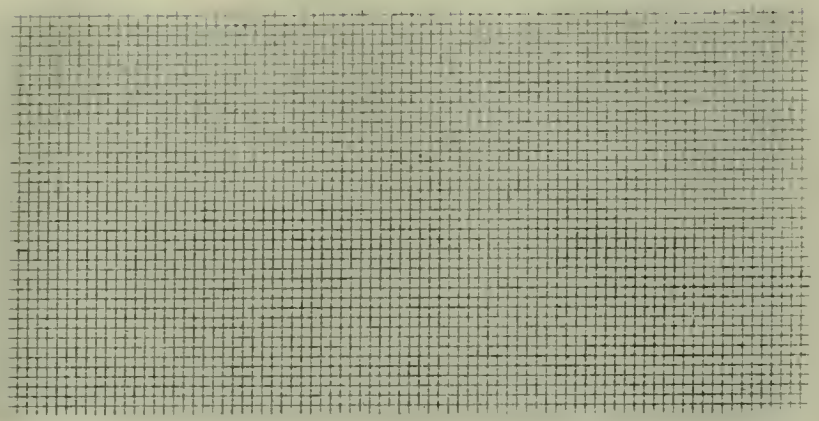
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

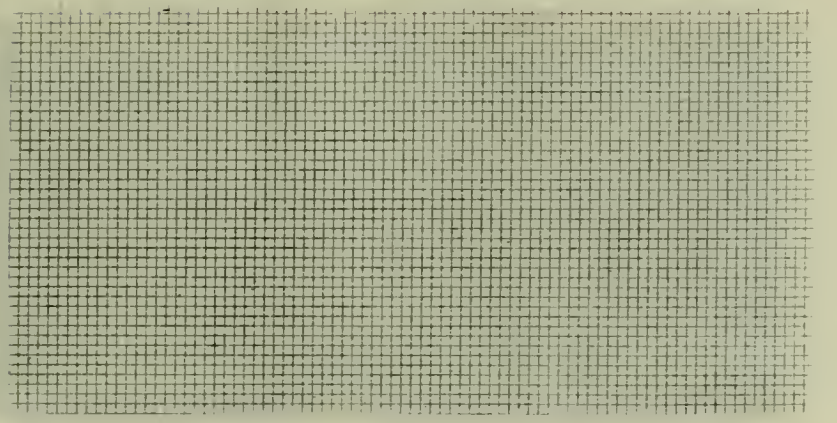
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN Nº

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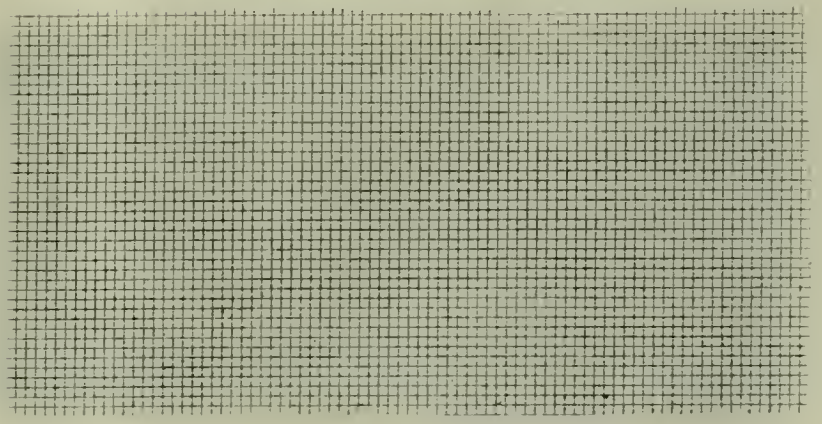
BLACK, WEFT. WHITE, WARP.



DESIGN No

BLACK WEFT . WHITE WARP

PICKS TO THE ROUND

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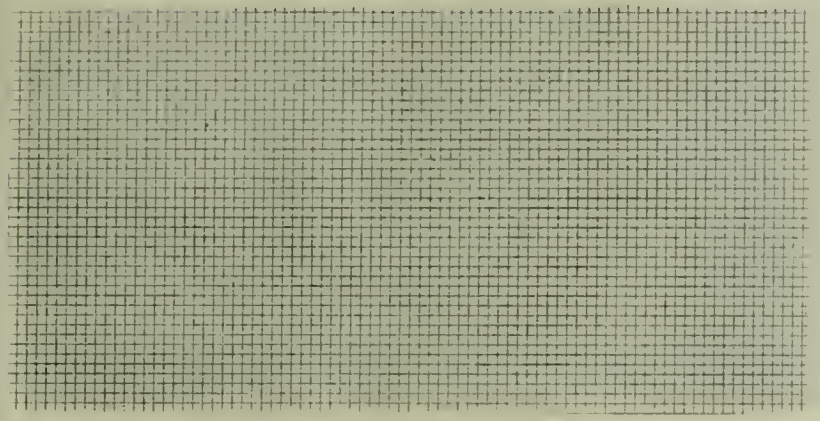
PICKS TO THE ROUND

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN Nº

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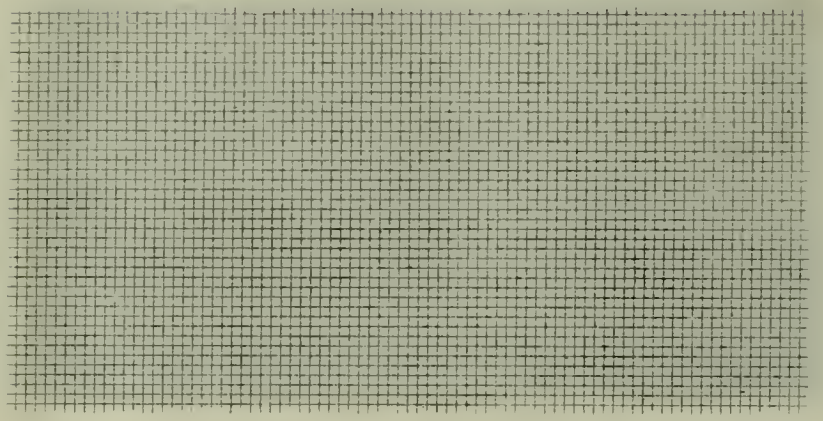

DESIGN Nº

SHAFTS PICKS TO THE ROUND

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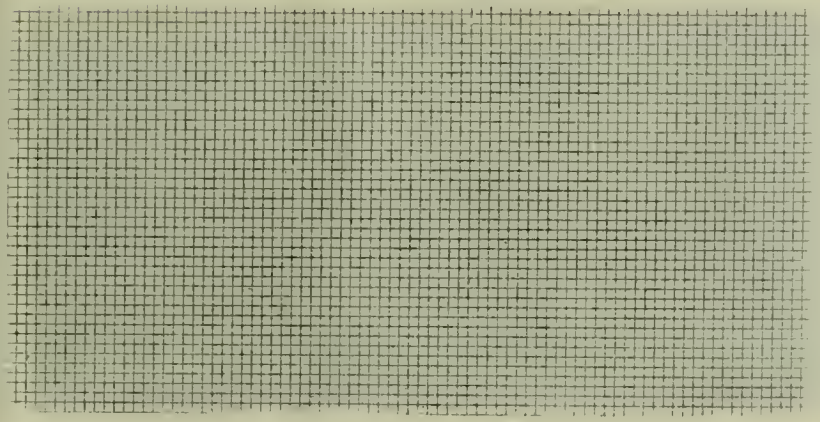

DESIGN Nº

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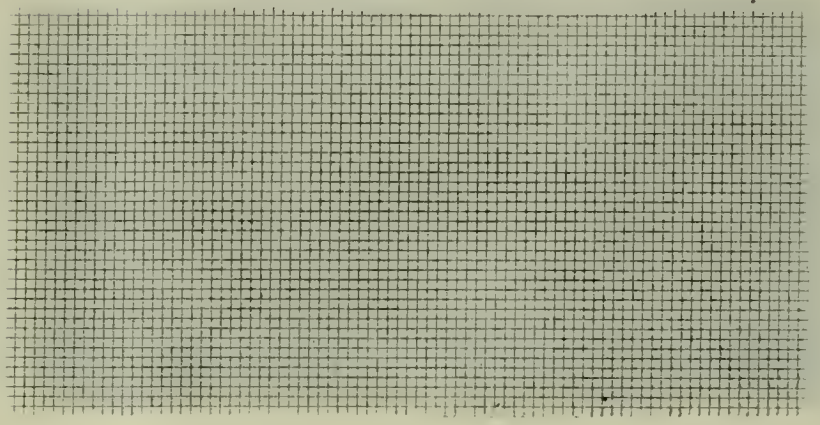
BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

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SHAFTS PICKS TO THE ROUND

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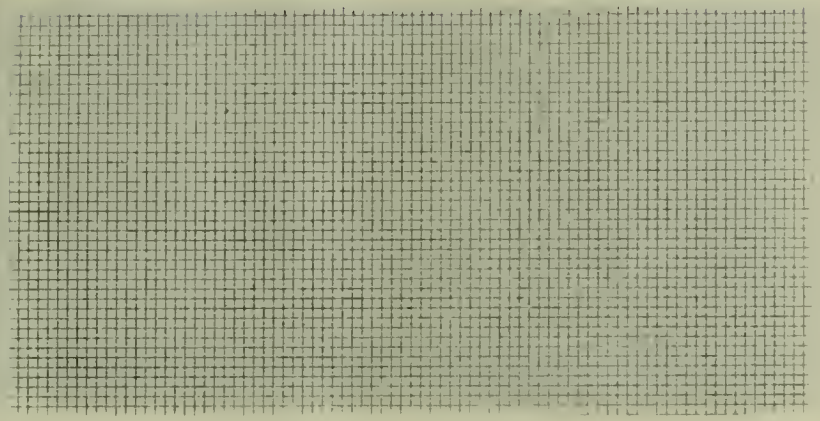

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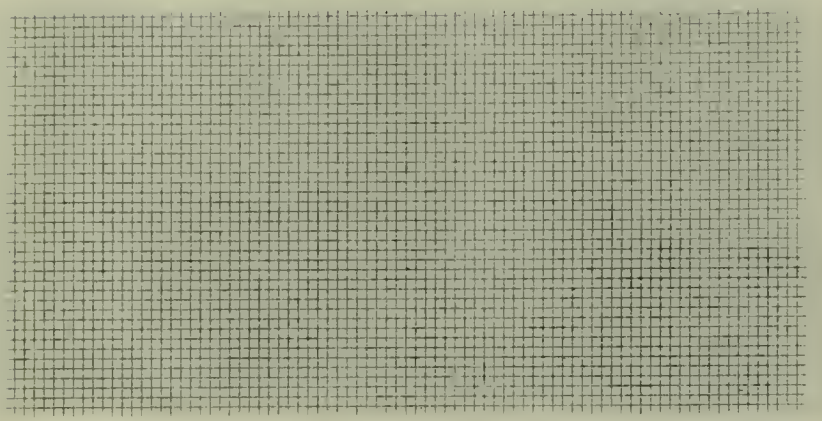
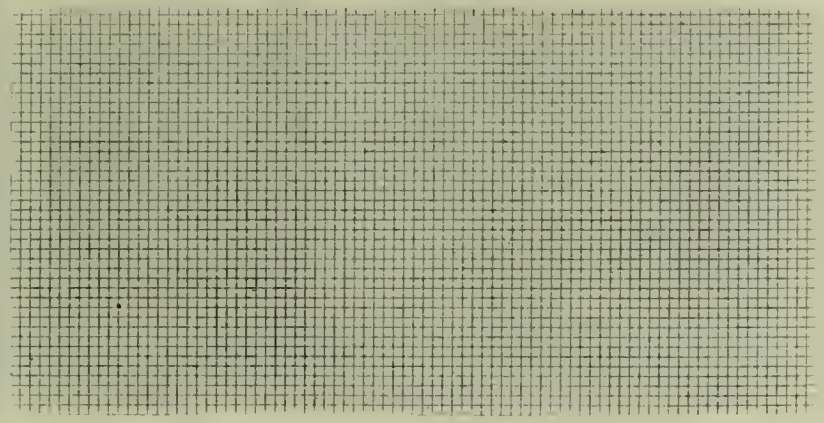
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

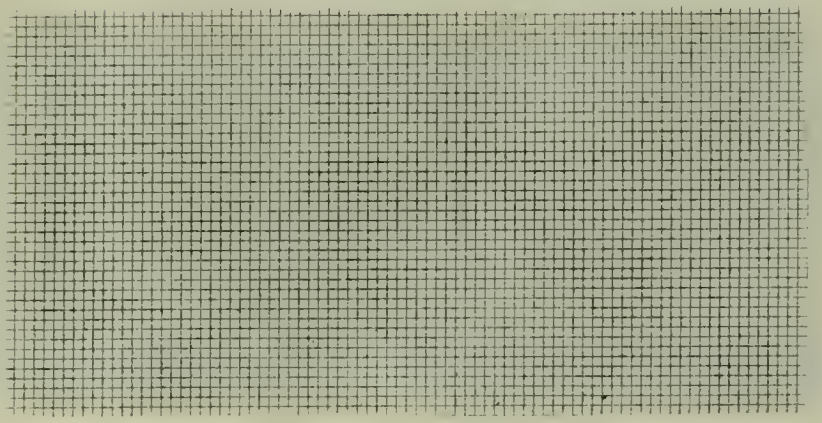
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

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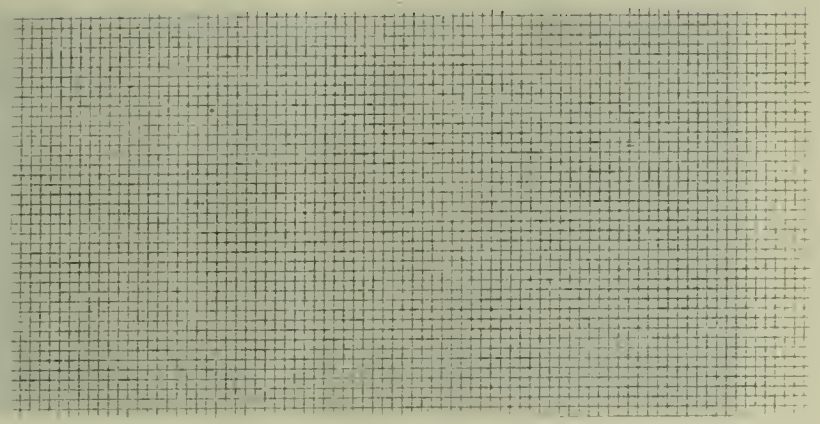
SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



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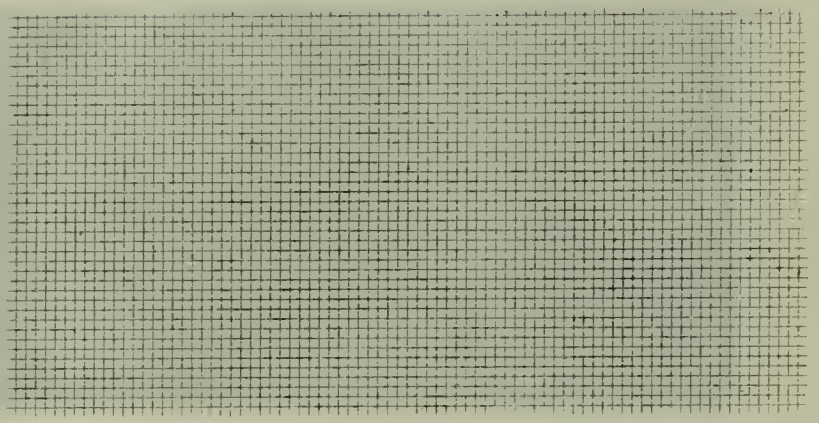
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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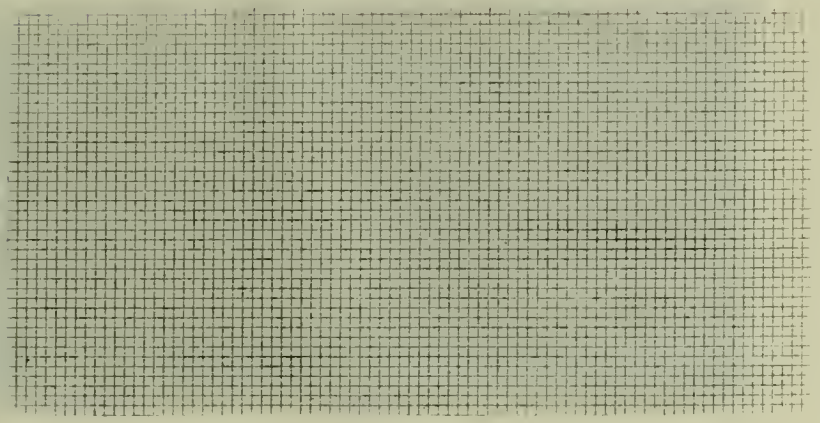
SHAFTS PICKS TO THE ROUND.

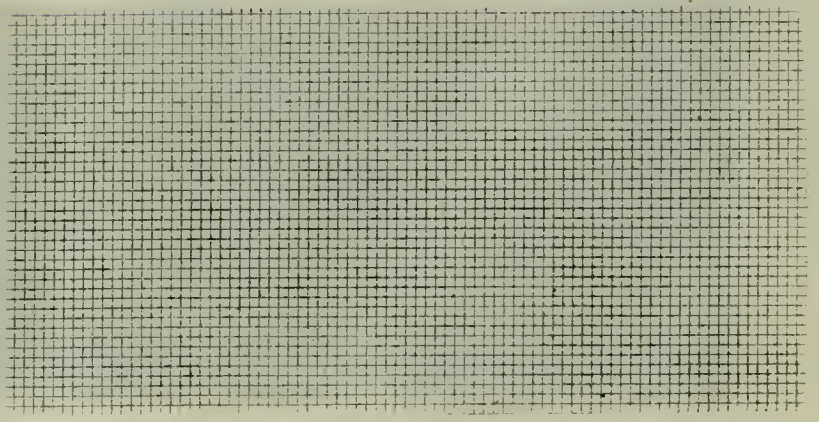
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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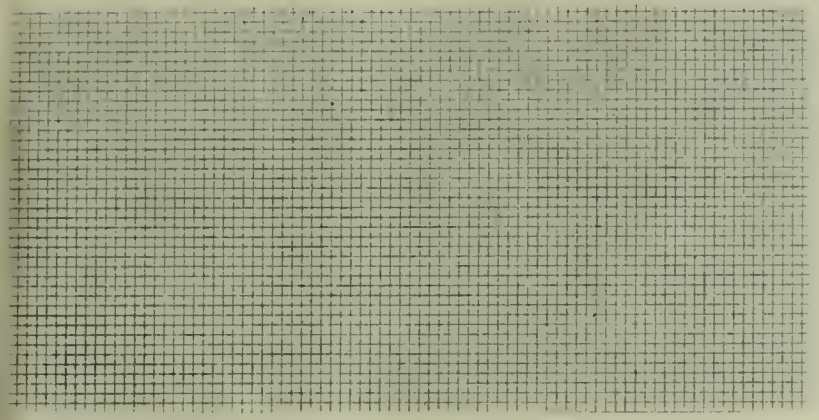
SHAFTS PICKS TO THE ROUND.

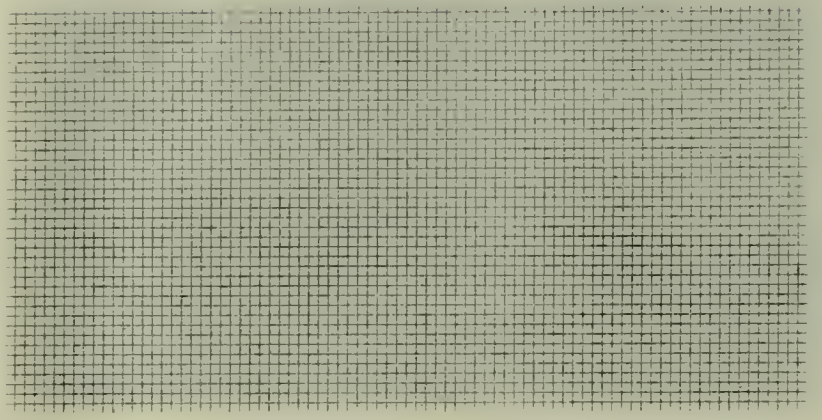
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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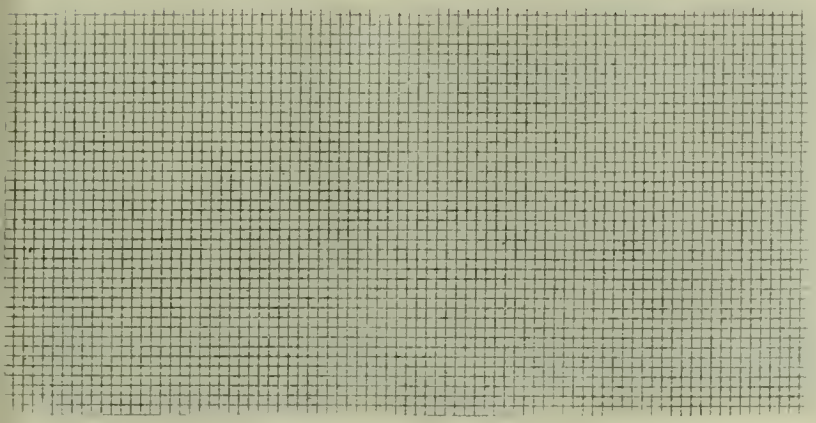
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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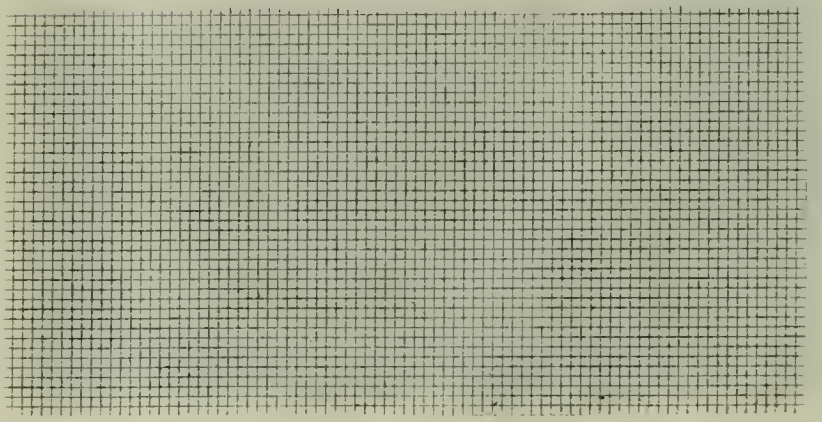
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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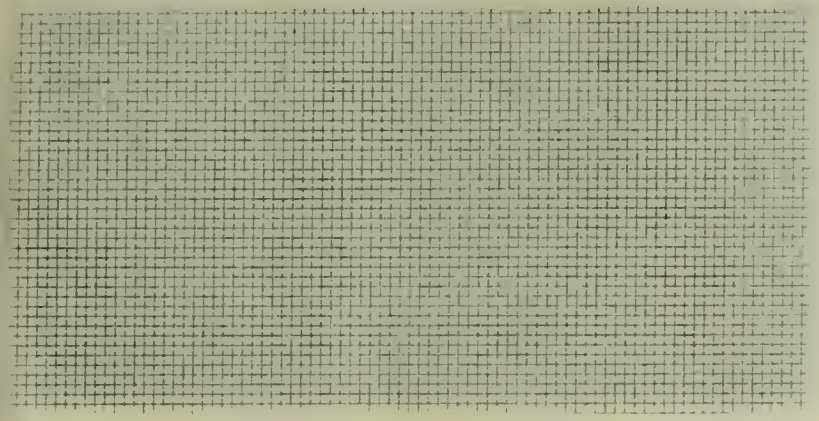
BLACK, WEFT. WHITE, WARP.



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SHAFTS PICKS TO THE ROUND.

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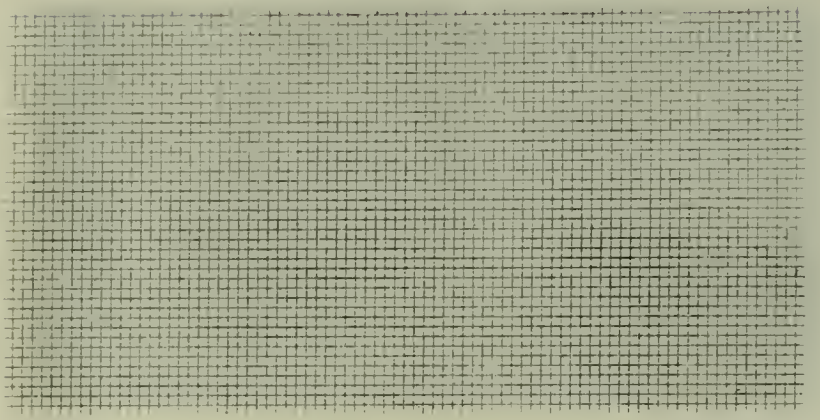

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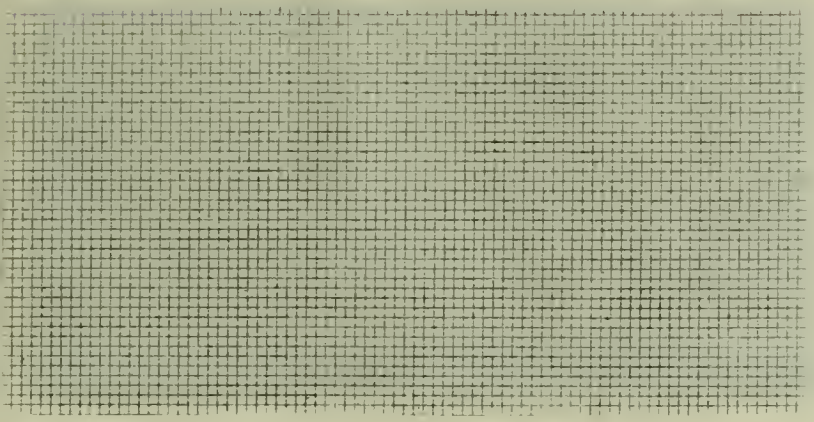
SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



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SHAFTS PICKS TO THE ROUND.

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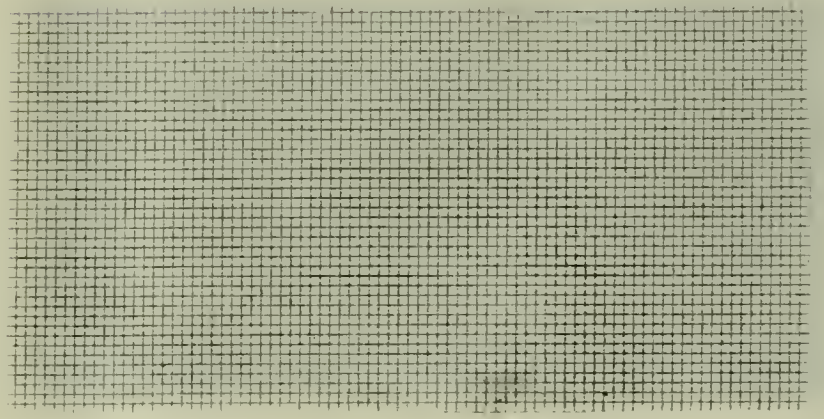

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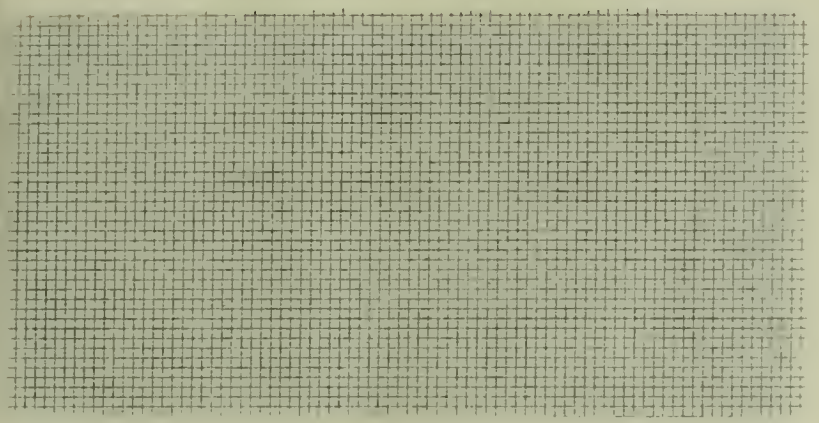
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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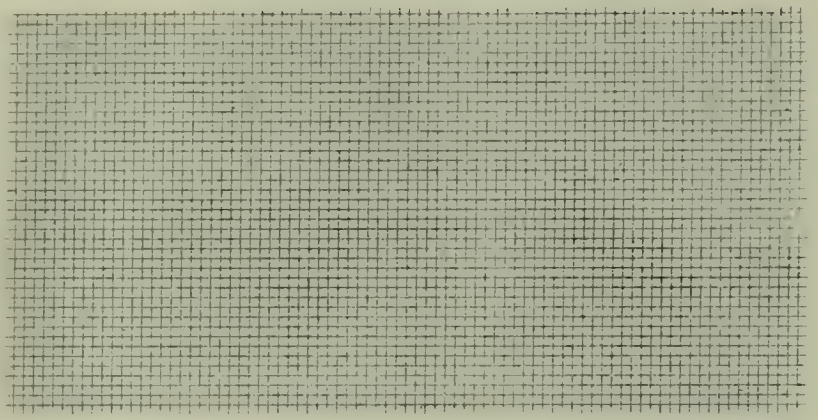
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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SHAFTS PICKS TO THE ROUND.

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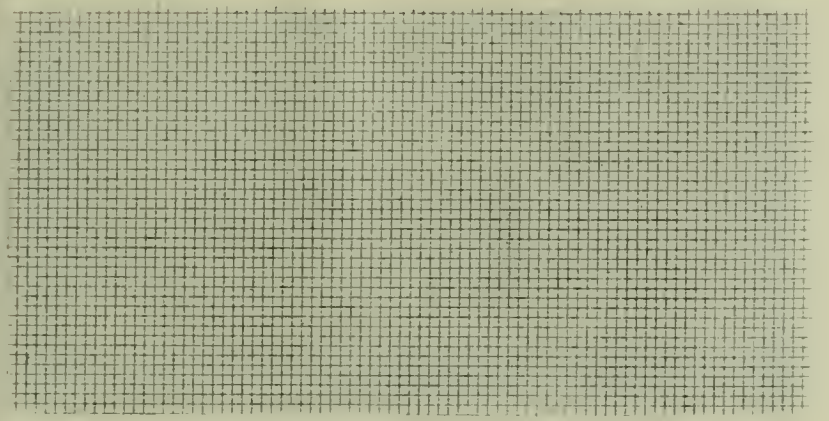

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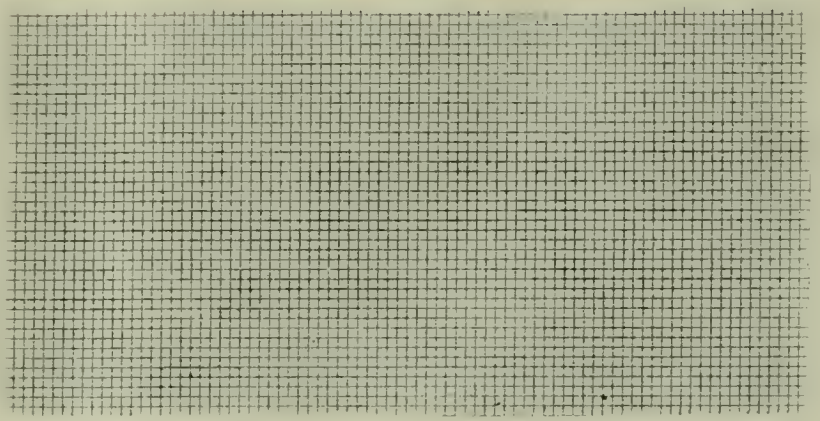
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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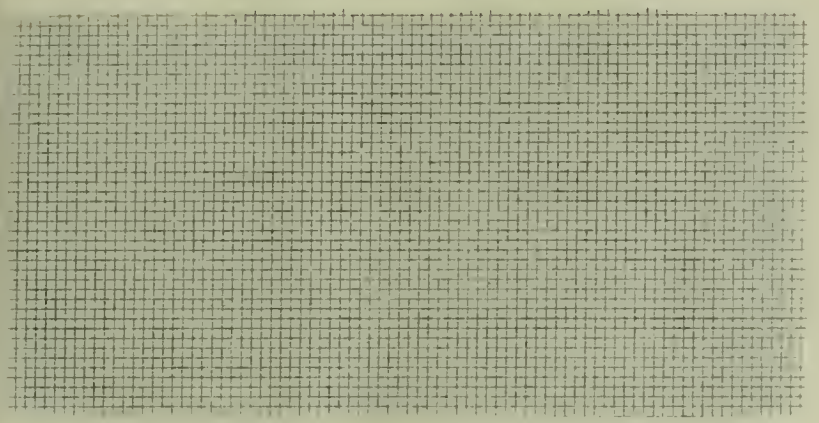
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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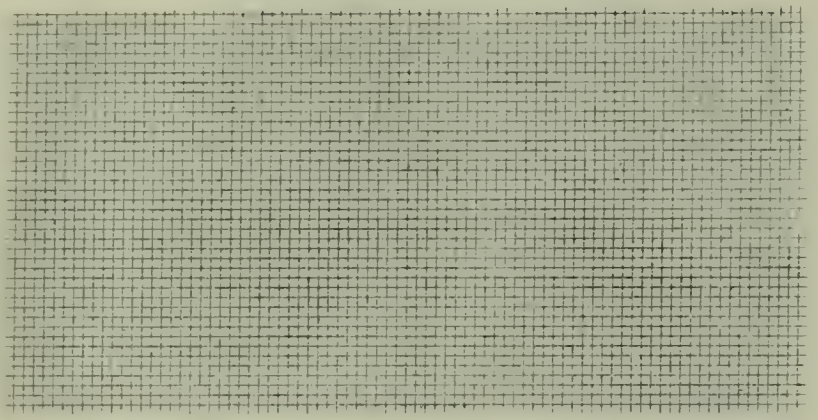
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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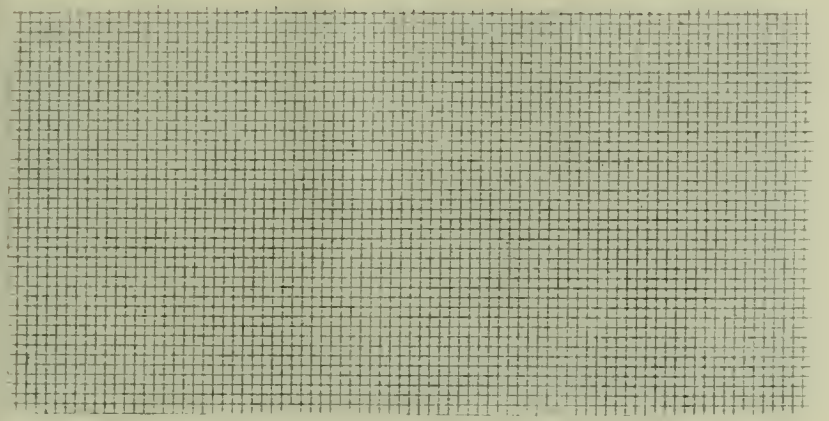
SHAFTS PICKS TO THE ROUND.

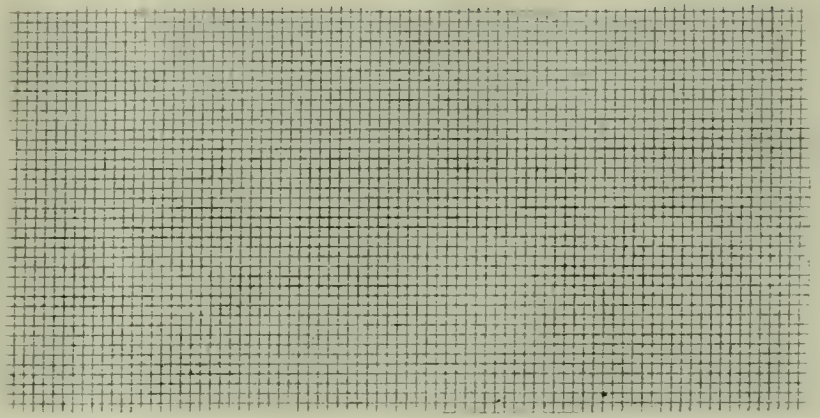
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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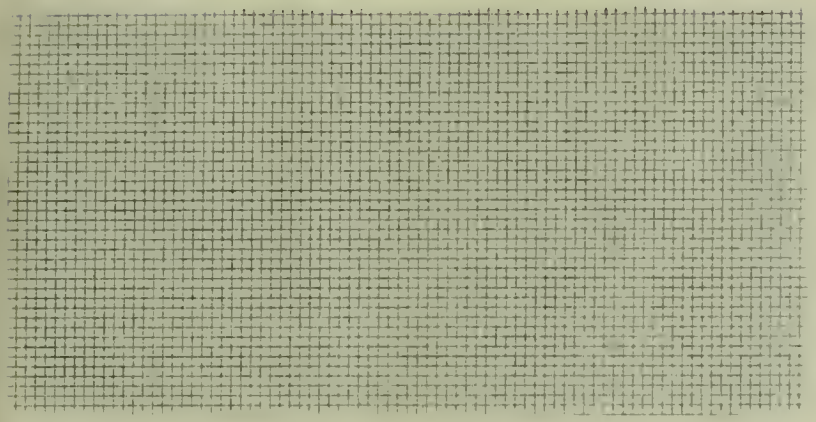
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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SHAFTS PICKS TO THE ROUND.

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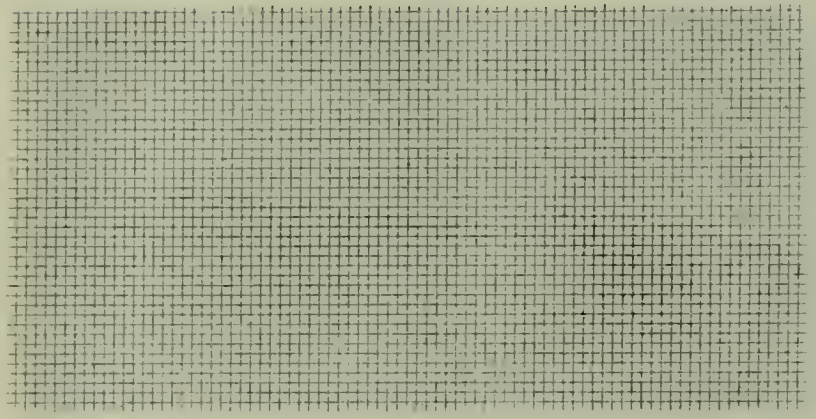

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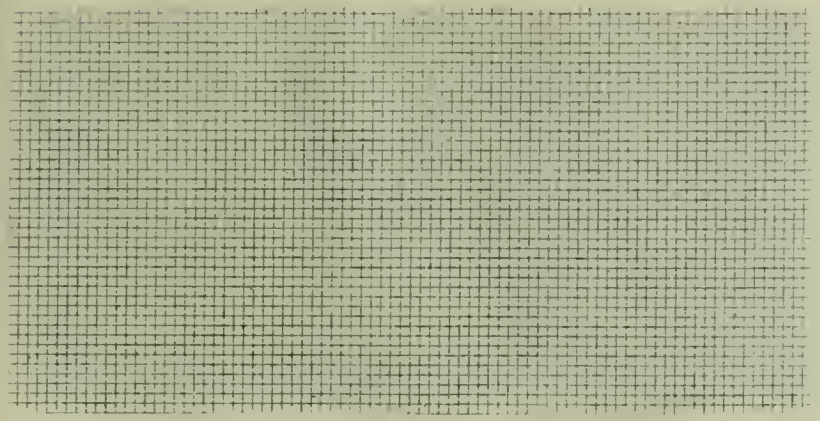
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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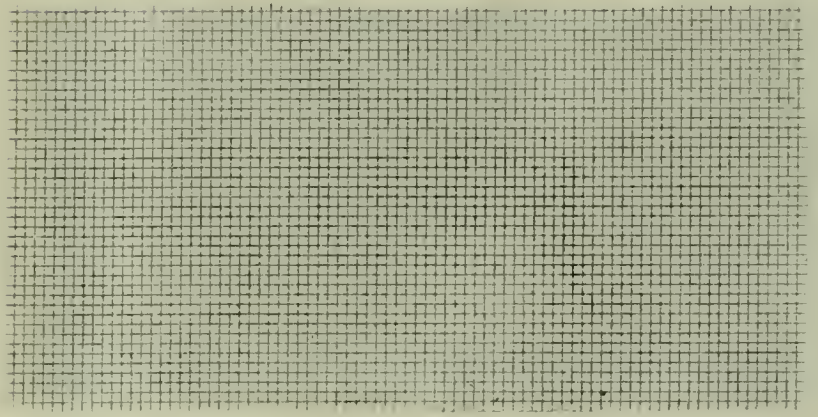
SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



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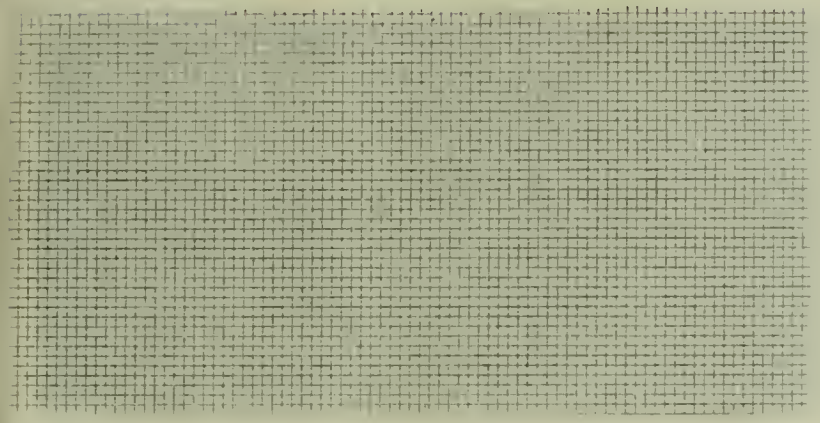

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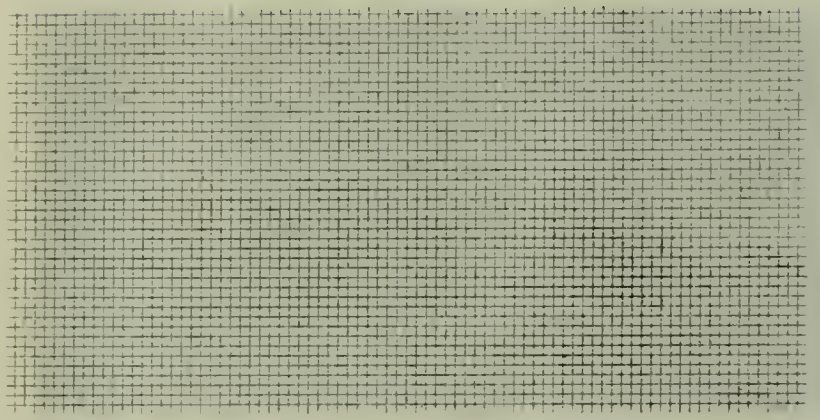

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SHAFTS PICKS TO THE ROUND.

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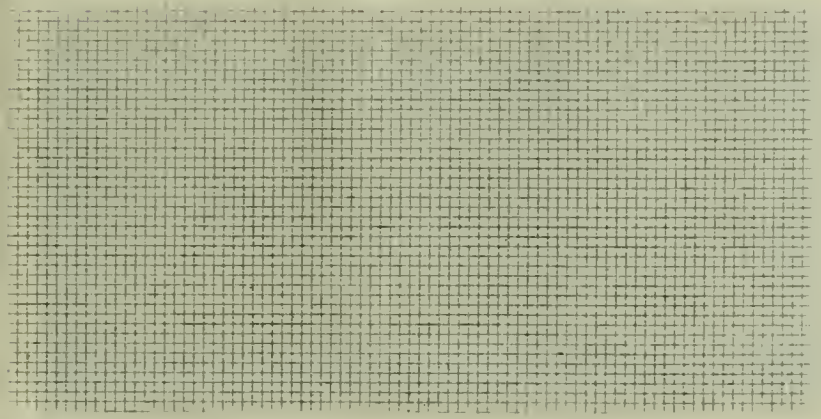

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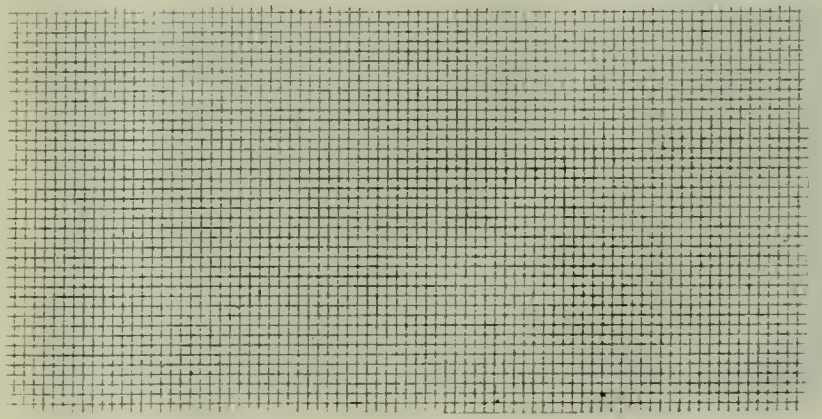

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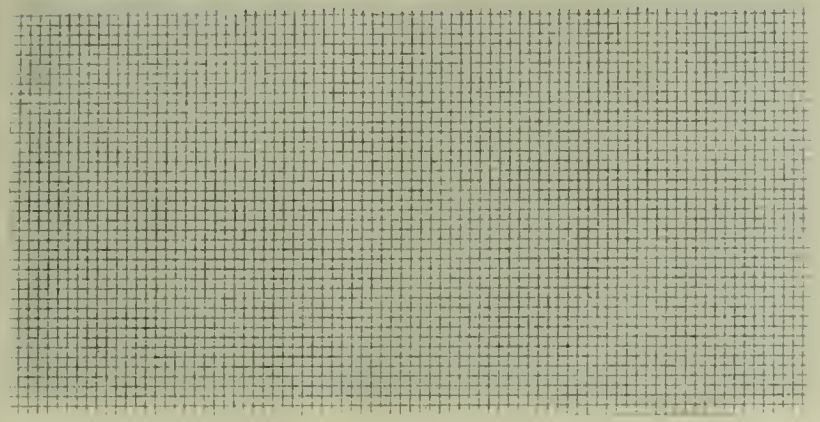
SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



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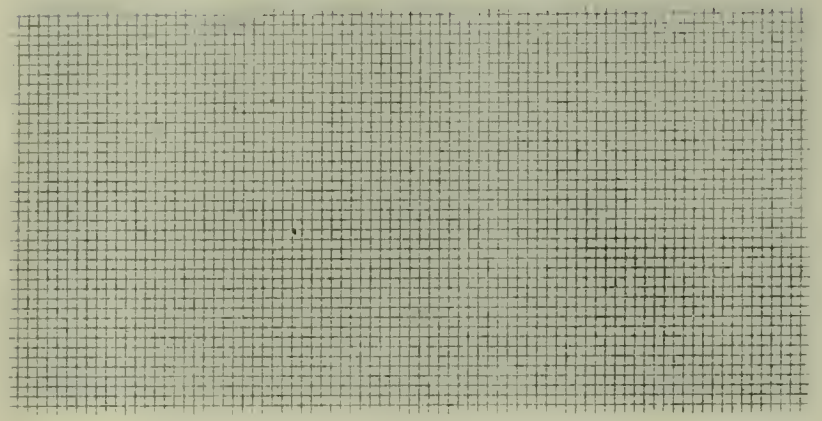
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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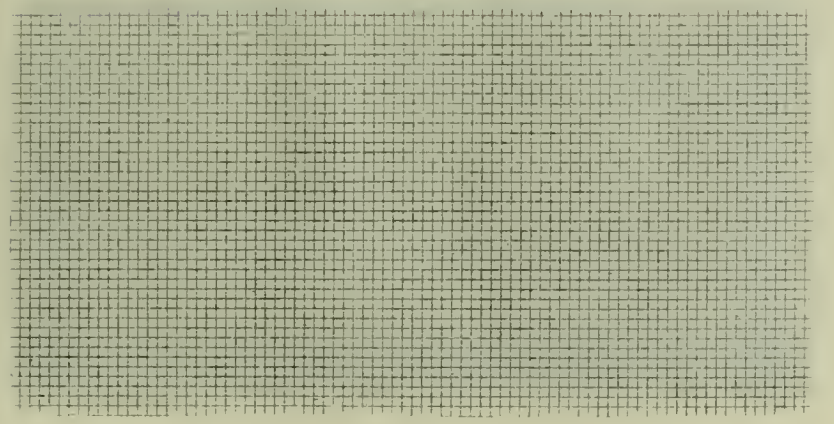

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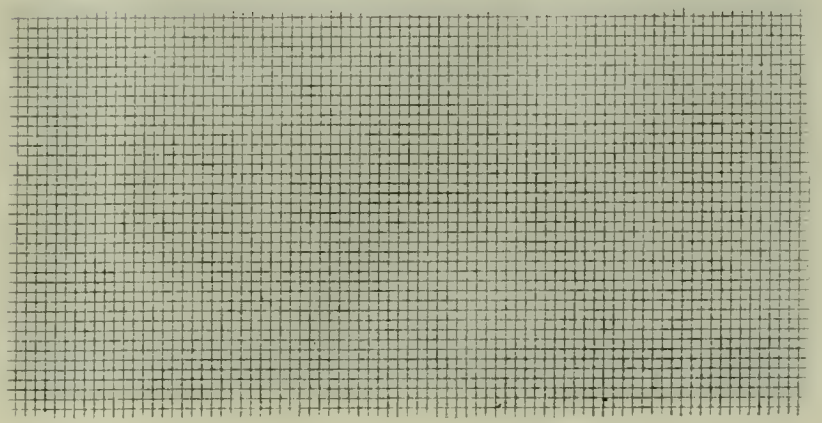
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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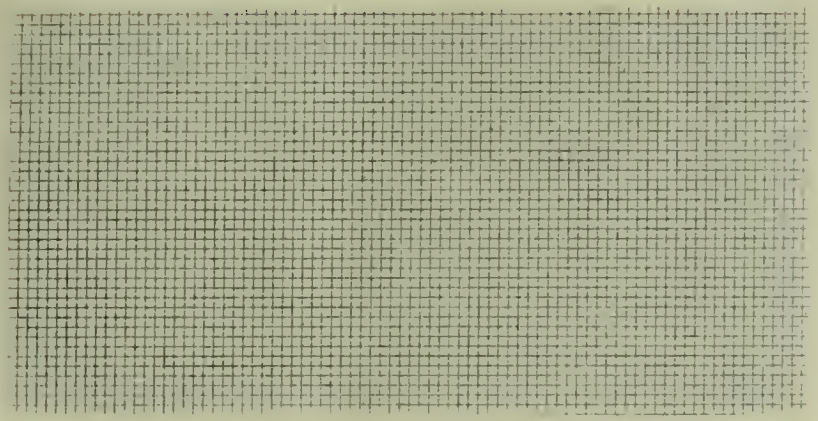
BLACK WEFT. WHITE, WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND

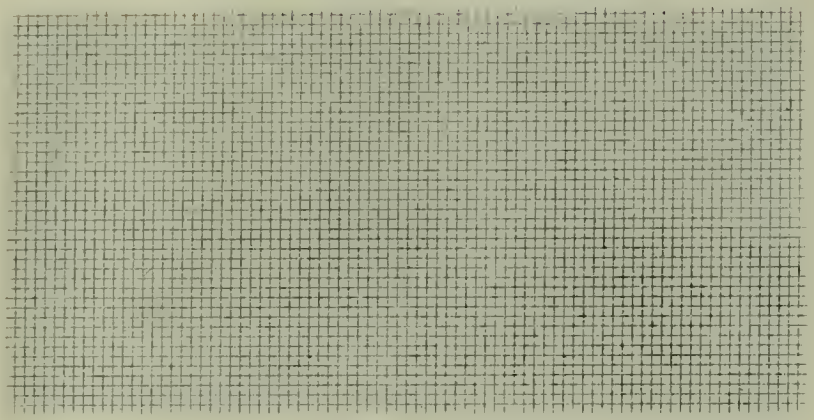
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

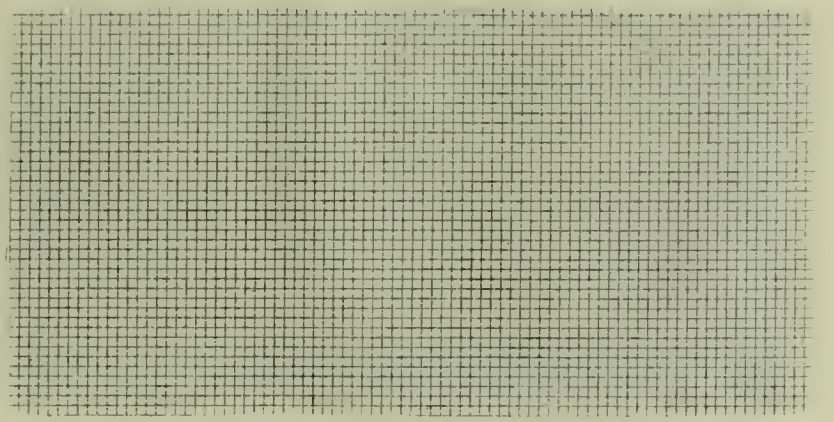
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

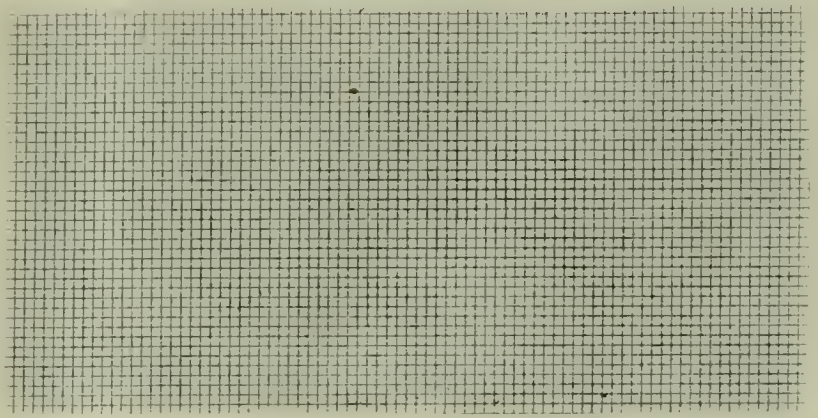
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No.

SHEETS PICKS TO THE ROUND.

BLACK. WEFT. WHITE. WARP.

DESIGN No.

SHEETS PICKS TO THE ROUND.

BLACK. WEFT. WHITE. WARP.

DESIGN No.

SHEETS PICKS TO THE ROUND.

BLACK. WEFT. WHITE. WARP.

DESIGN No.

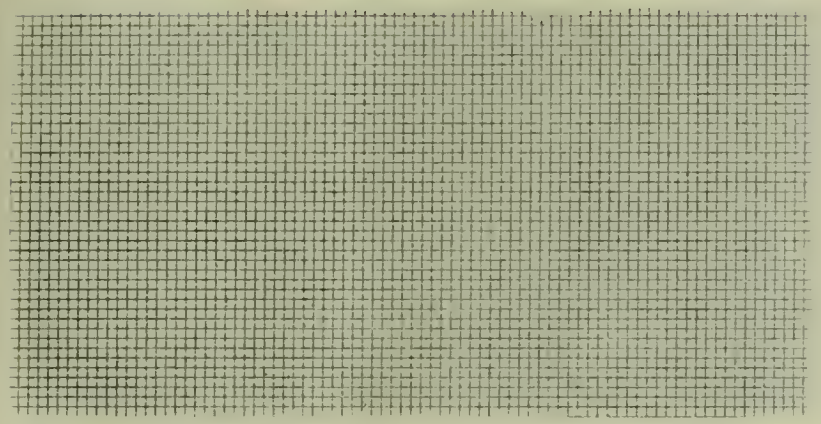
SHEETS PICKS TO THE ROUND.

BLACK. WEFT. WHITE. WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

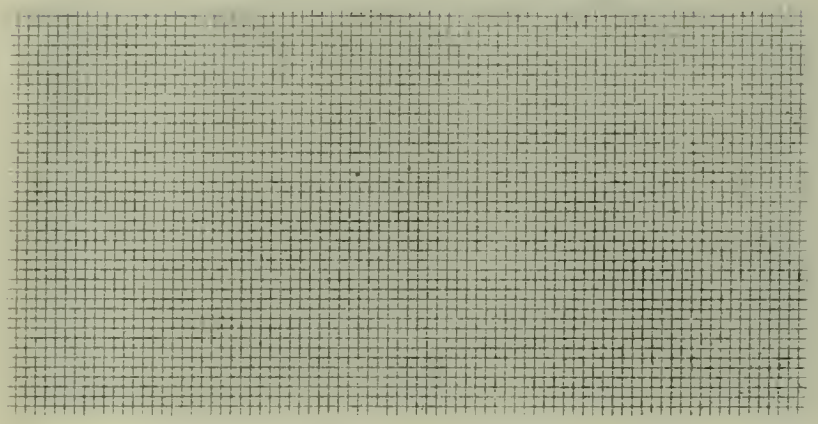
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

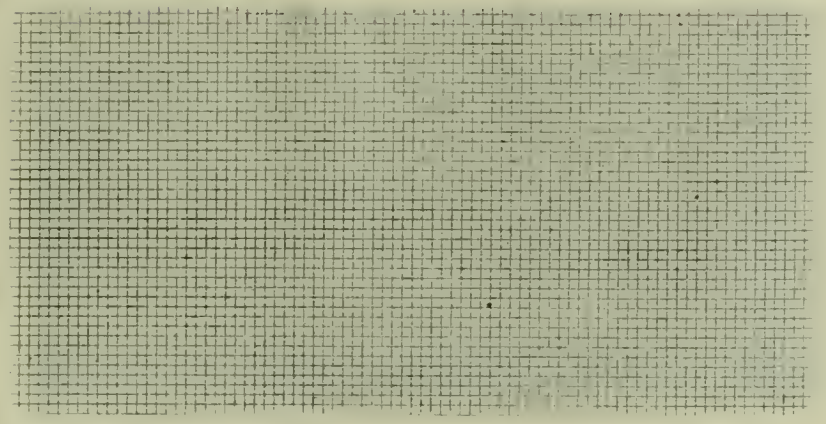
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

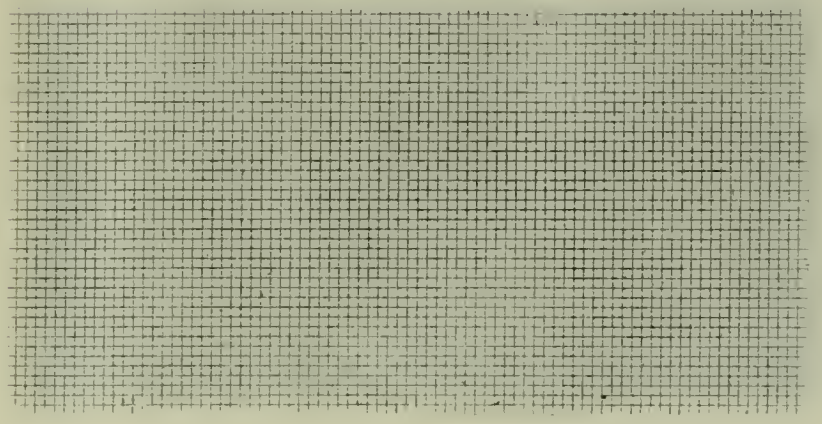
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

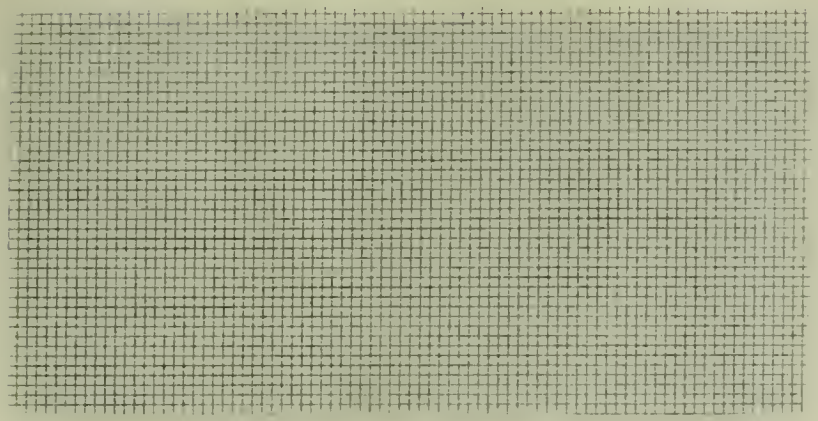
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

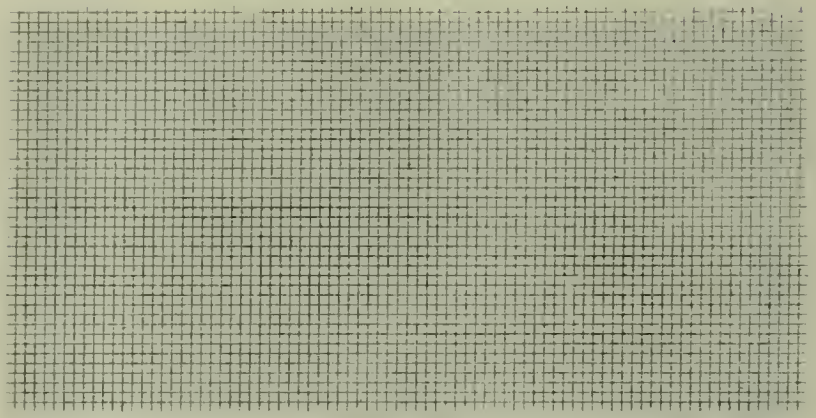
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

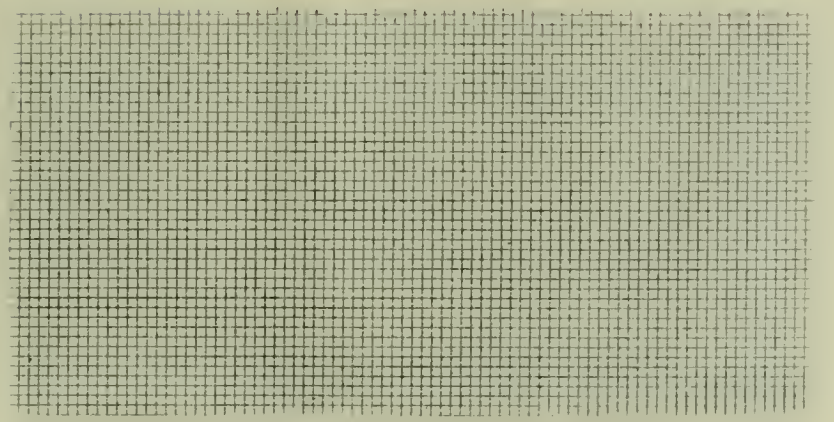
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

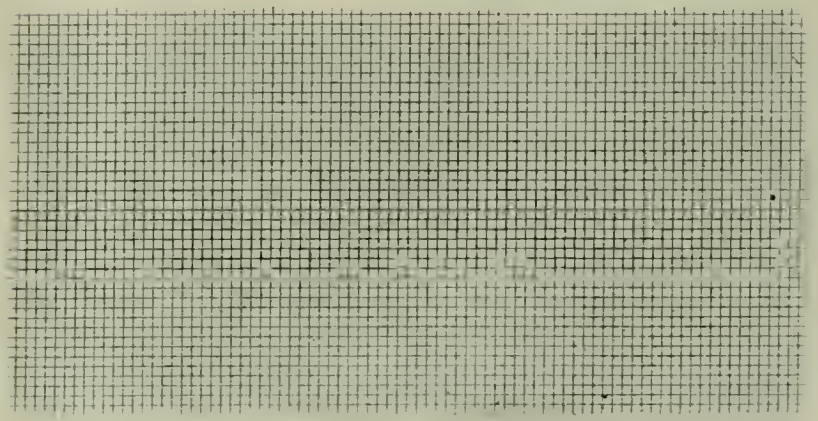
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

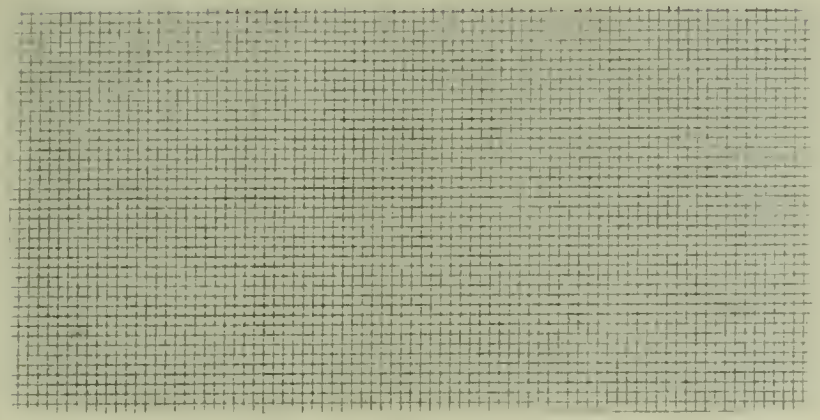
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

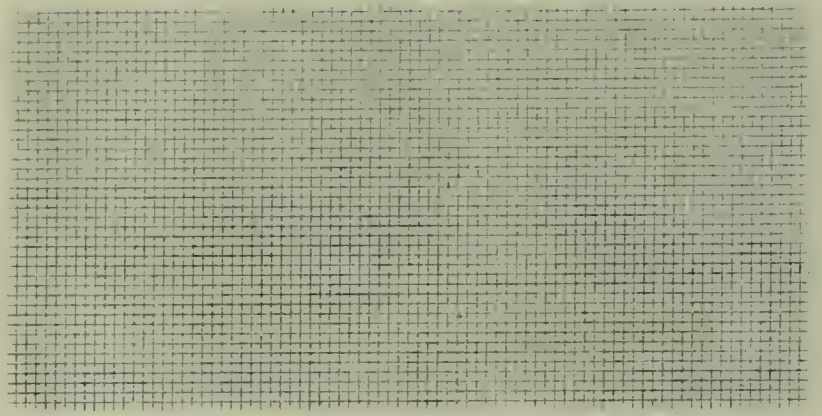
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

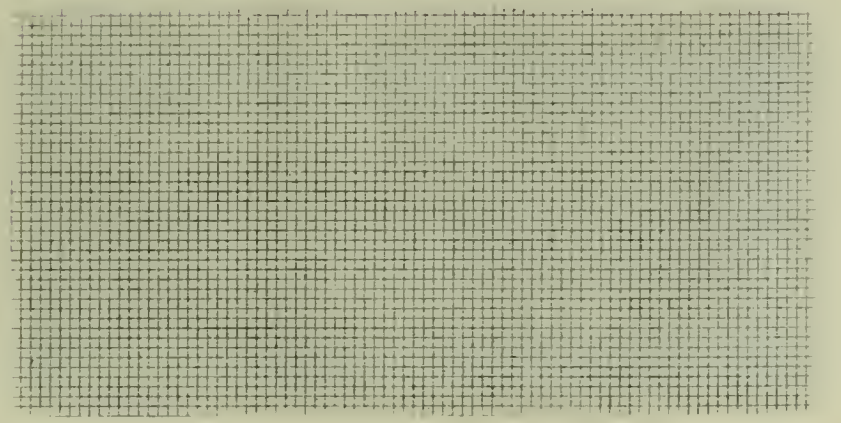
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

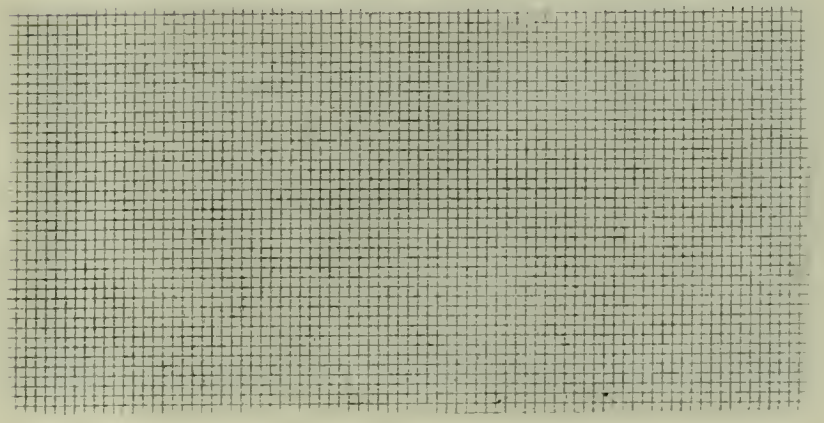
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN #4

SHUTTLE: picks to the round

BLACK WEFT WHITE WARP

DESIGN #5

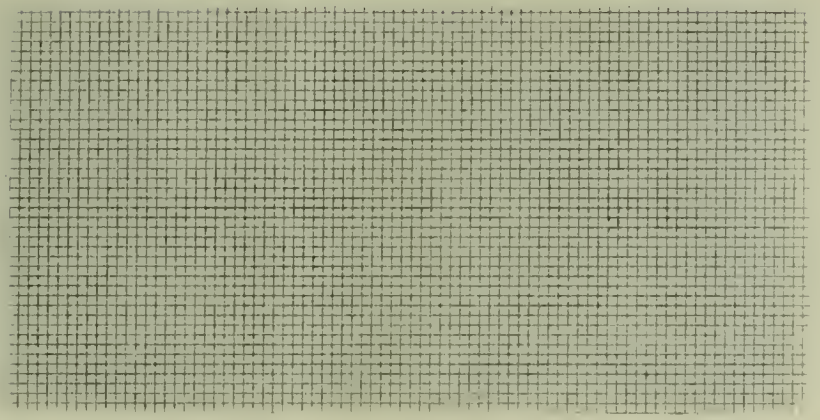
SHUTTLE: picks to the round

BLACK WEFT WHITE WARP

DESIGN Nº

SHAFTS PICKS TO THE ROUND

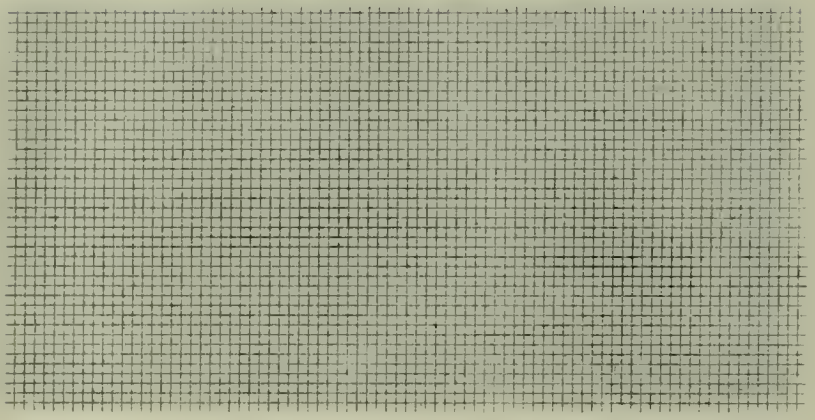
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

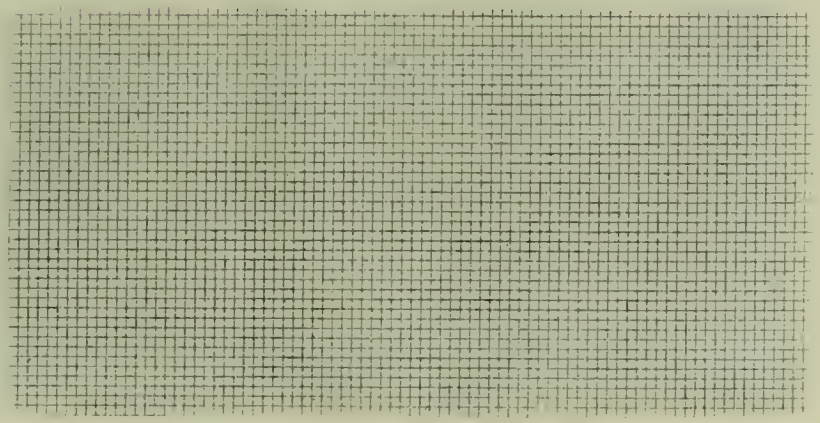
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

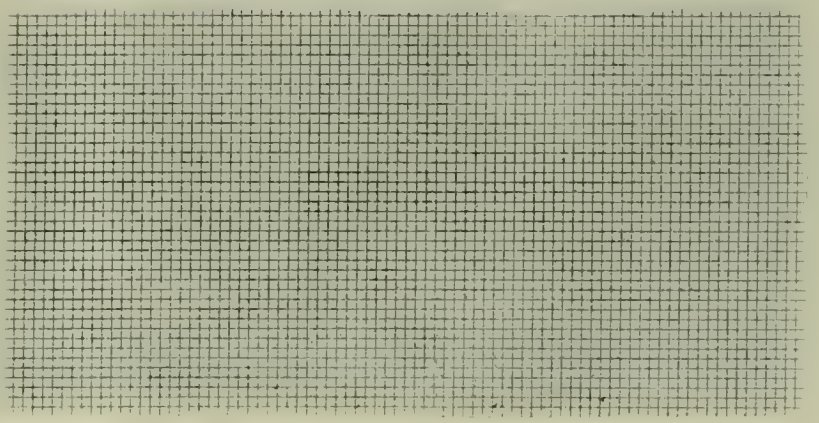
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

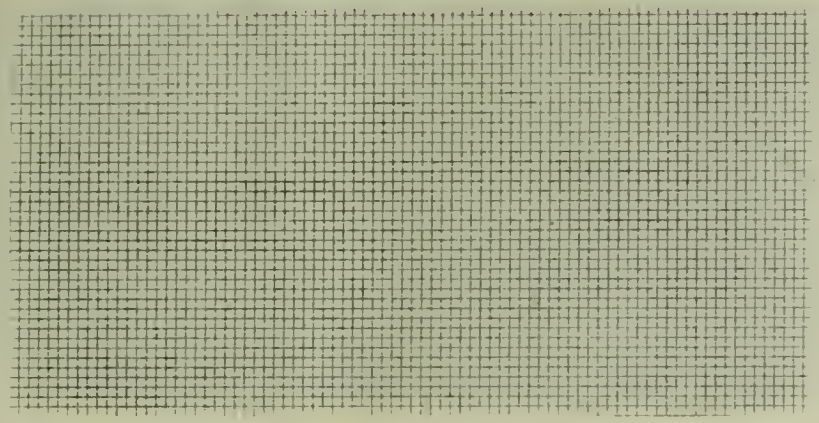
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

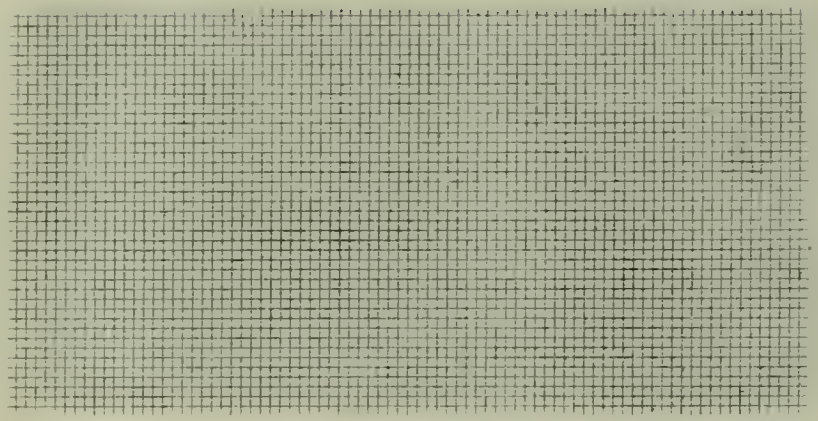
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

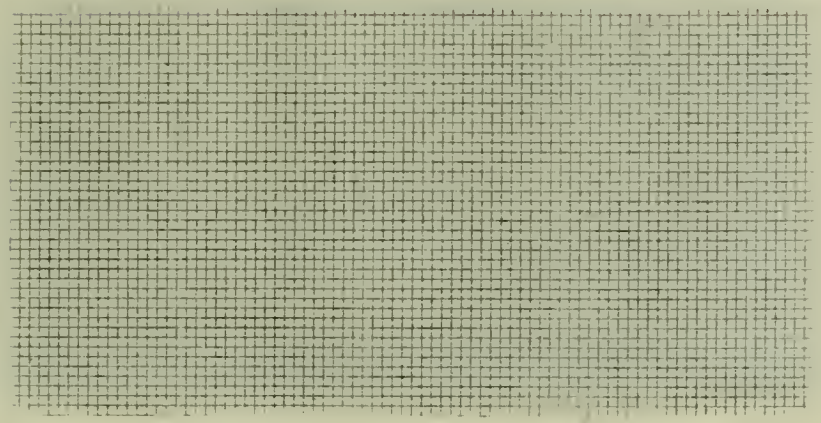
BLACK. WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

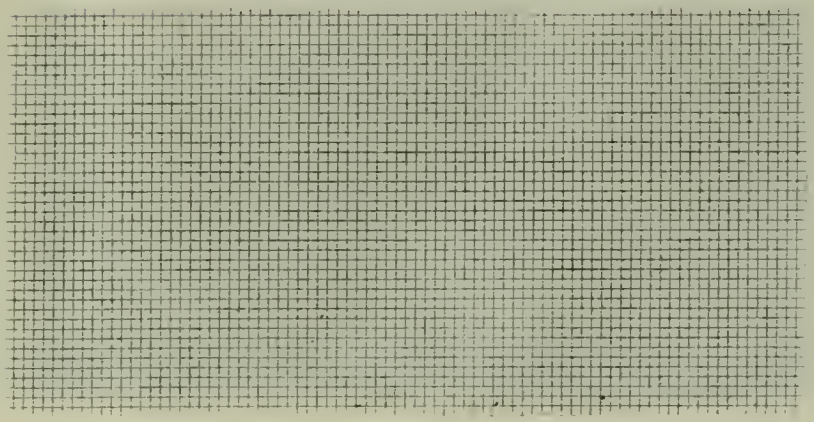
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

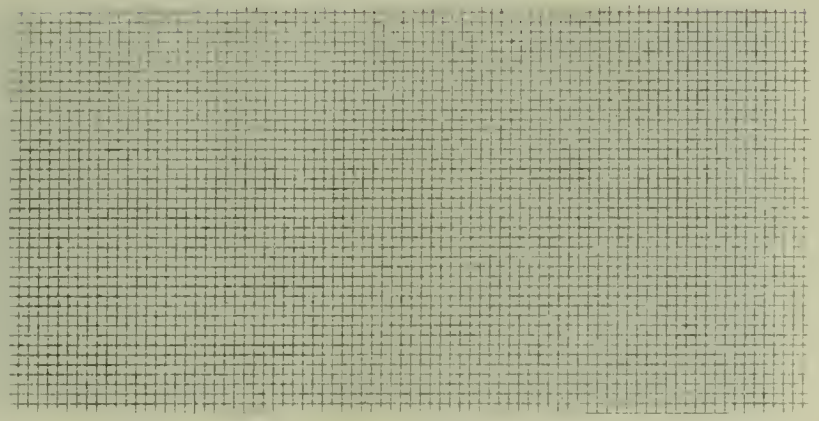
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

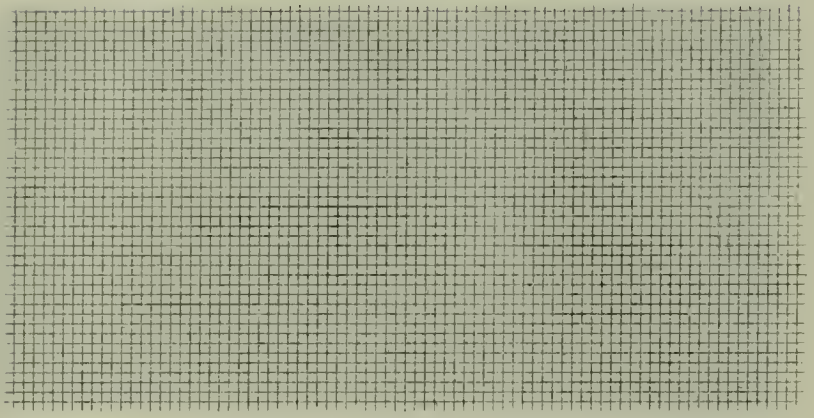
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

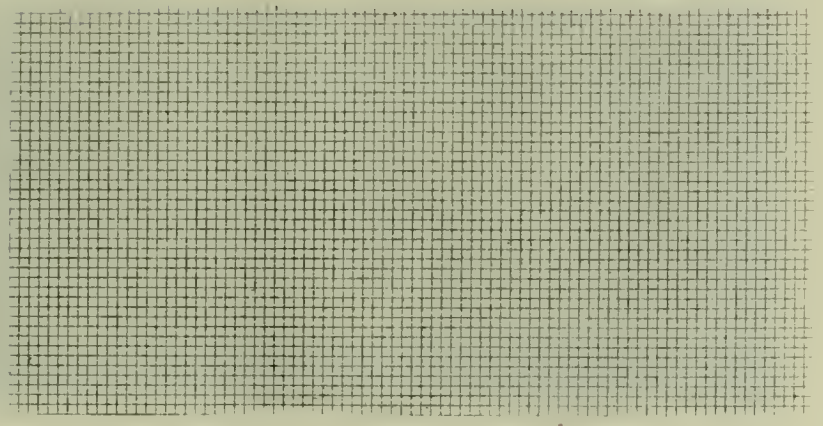
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

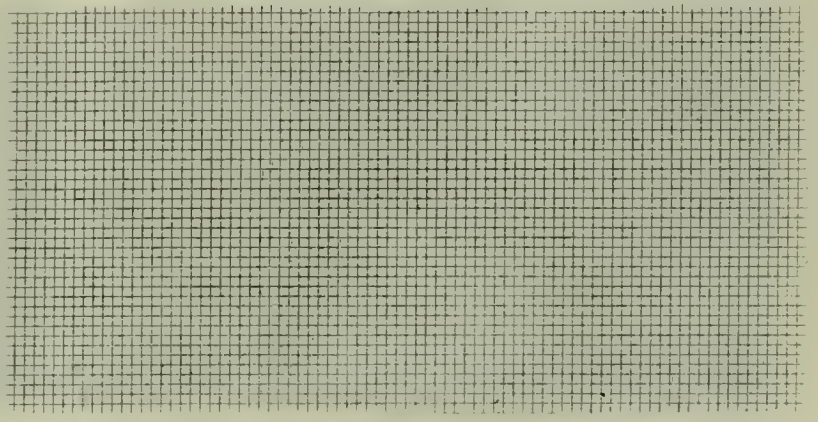
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

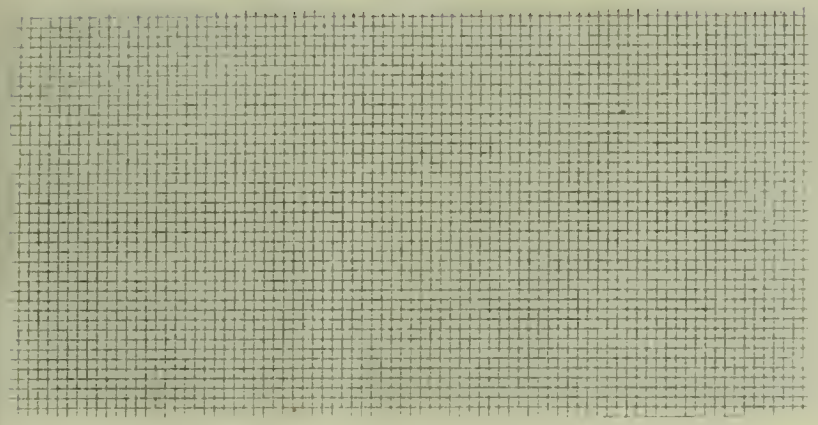
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

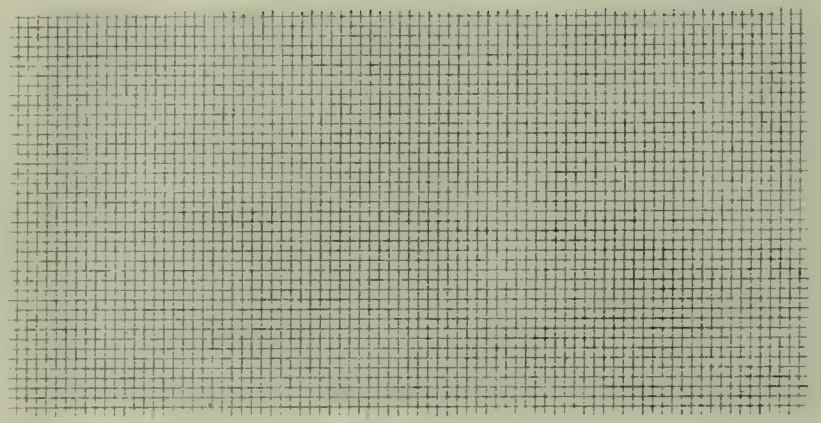
BLACK, WEFT. WHITE. WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

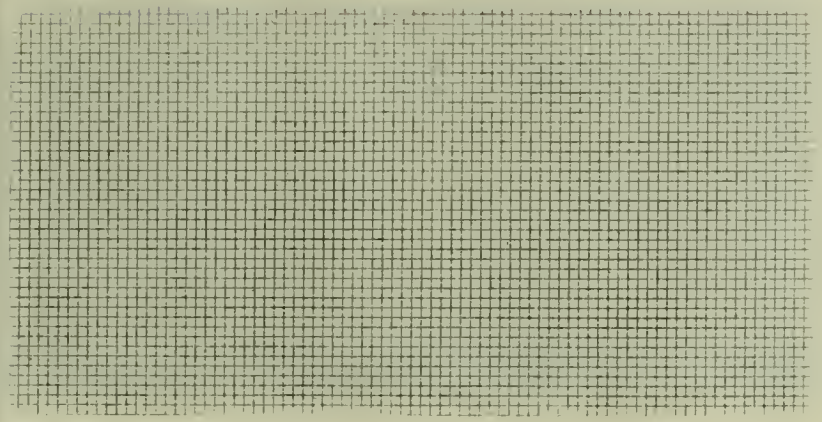
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

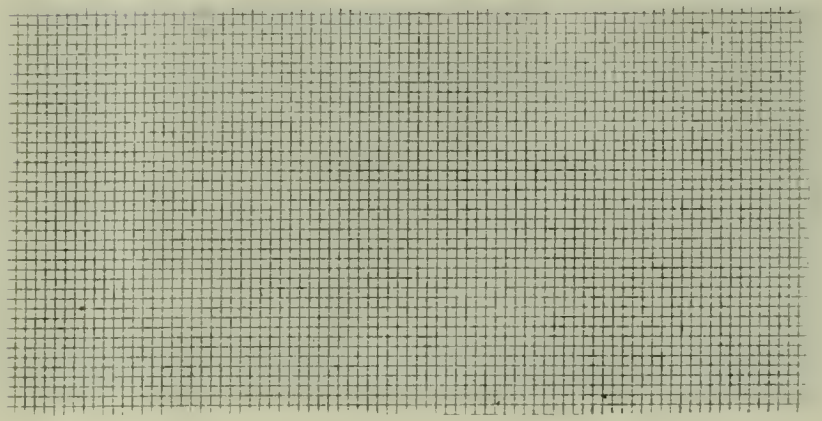
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

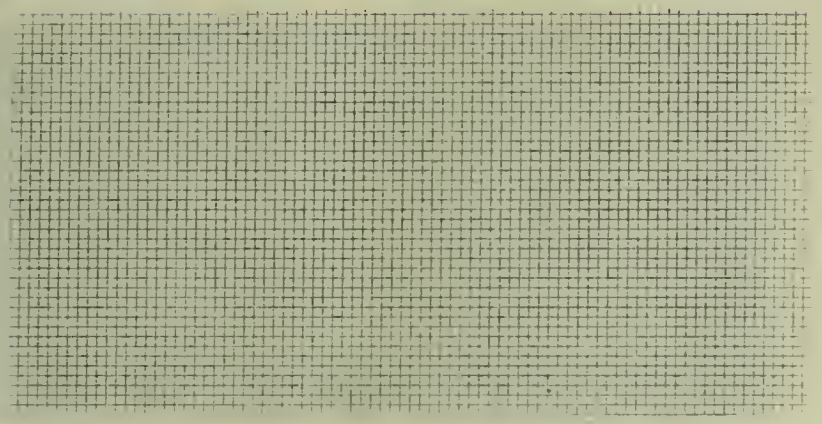
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

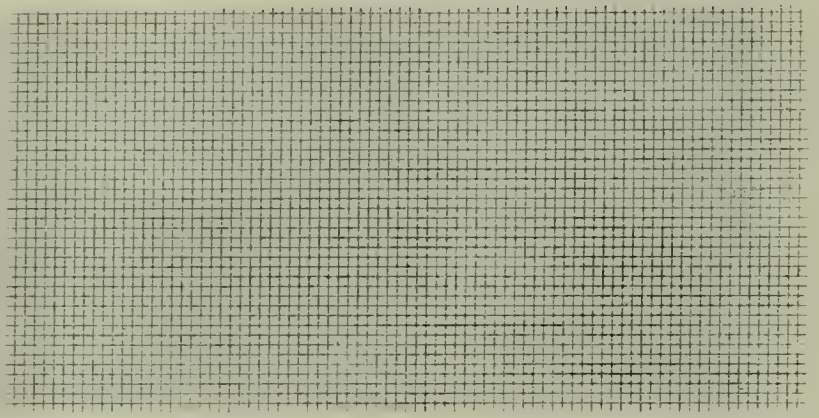
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

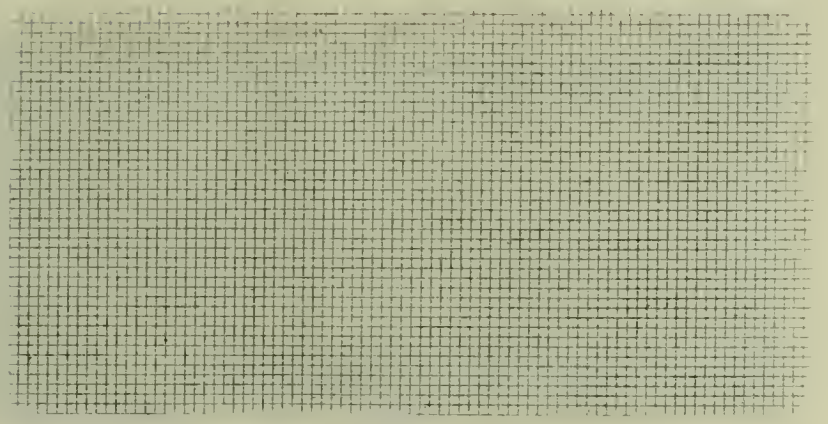
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

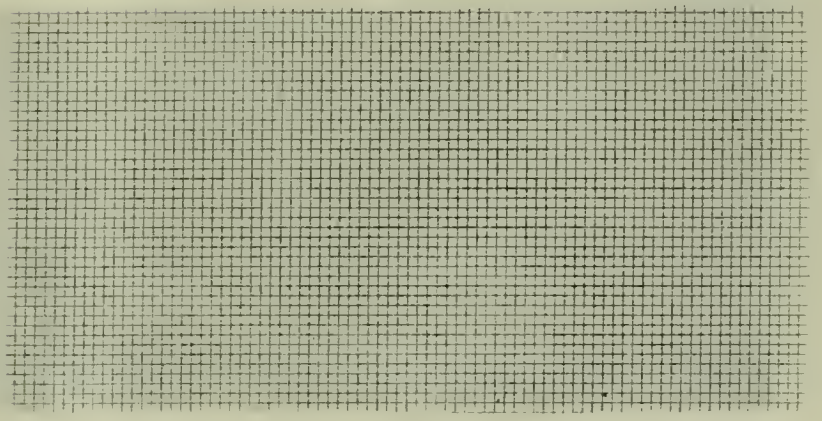
BLACK. WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

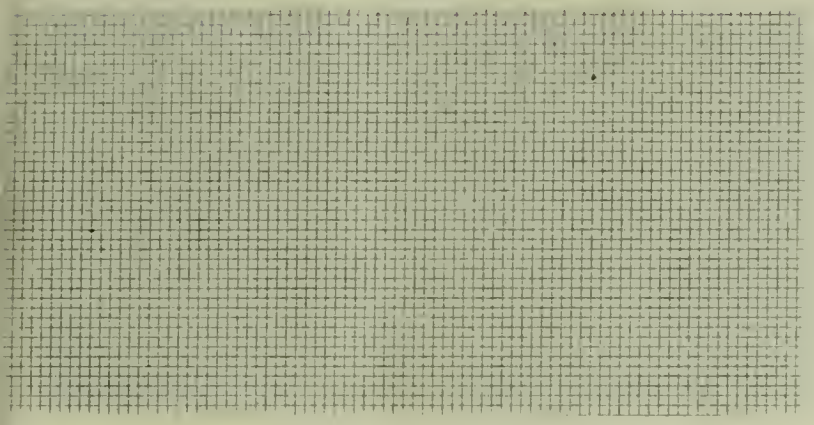
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

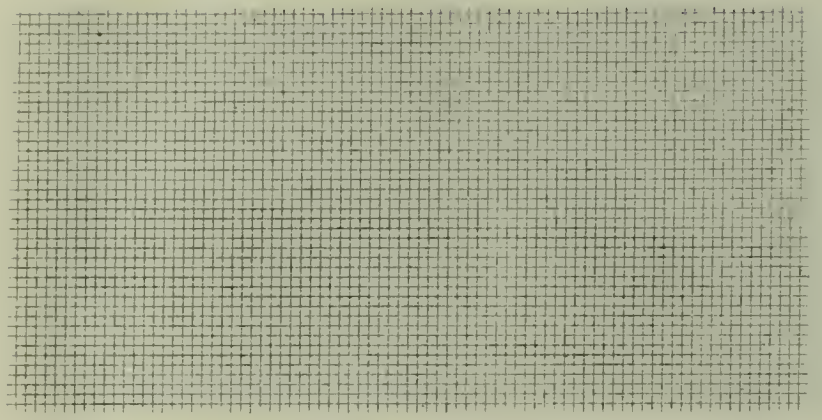
BLACK. WEFT. WHITE. WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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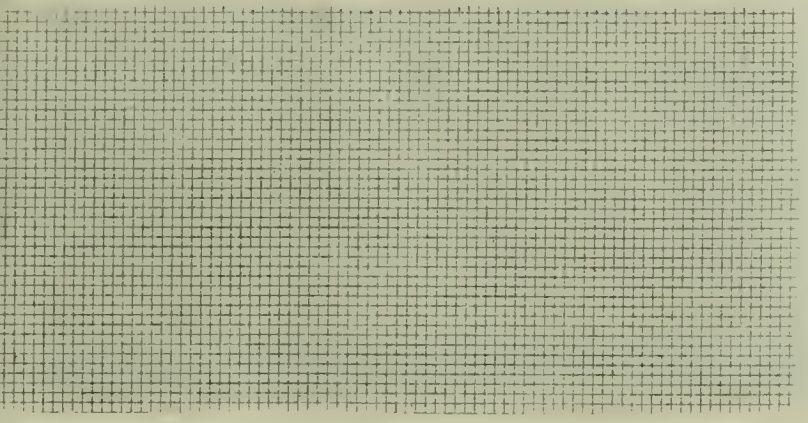
SHAFTS PICKS TO THE ROUND.

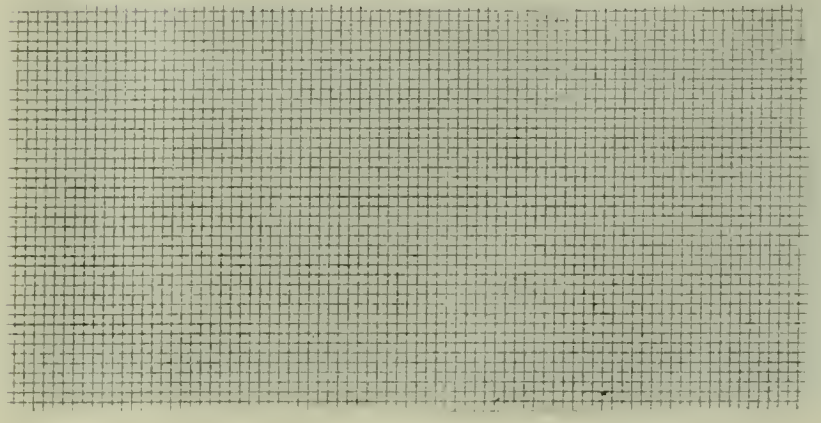
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

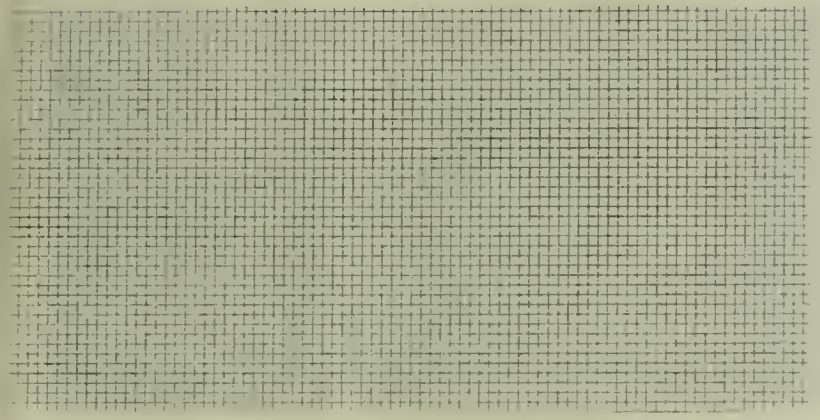
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

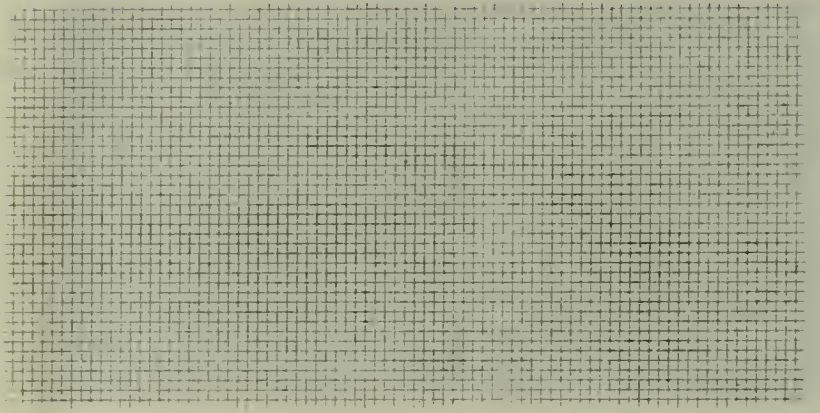
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

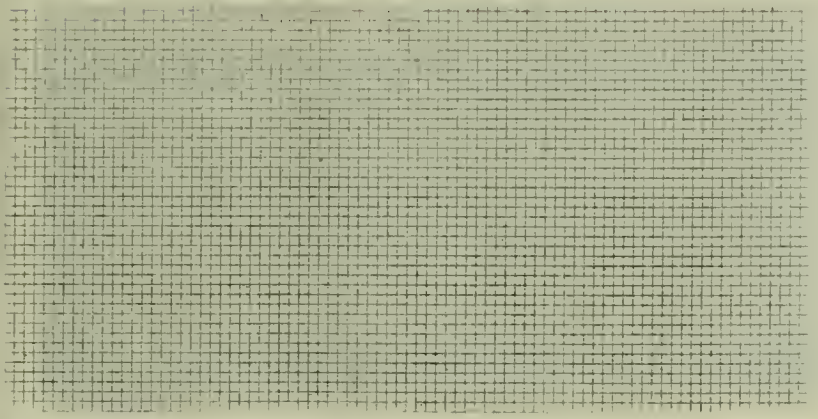
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

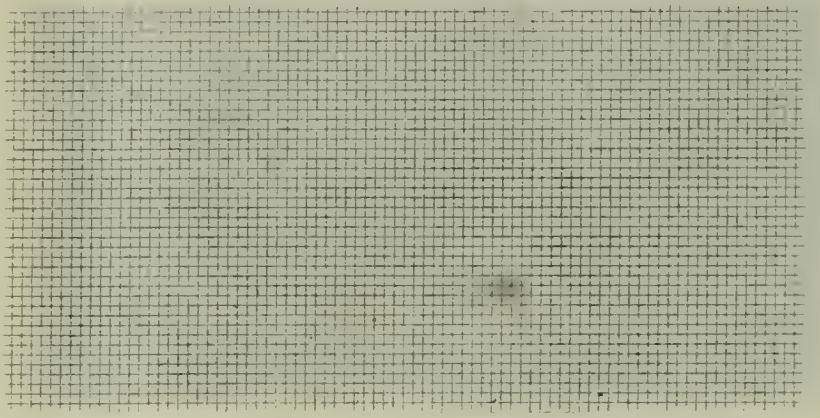
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

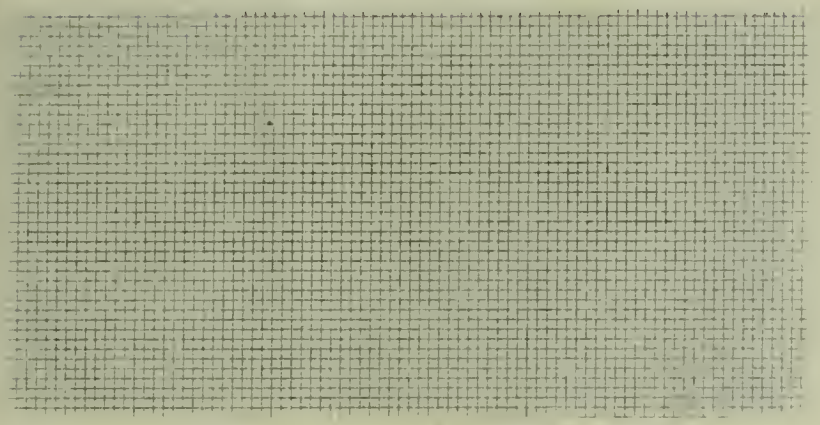
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

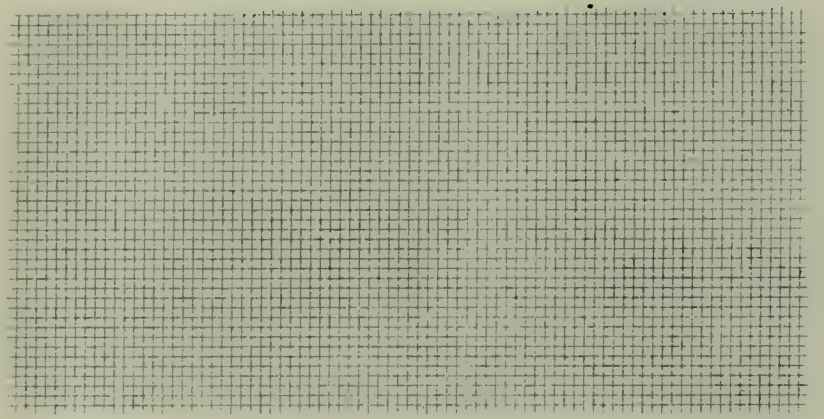
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

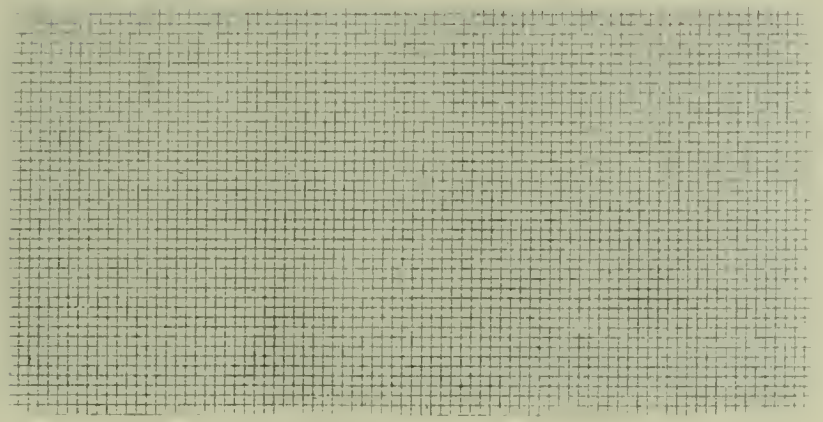
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

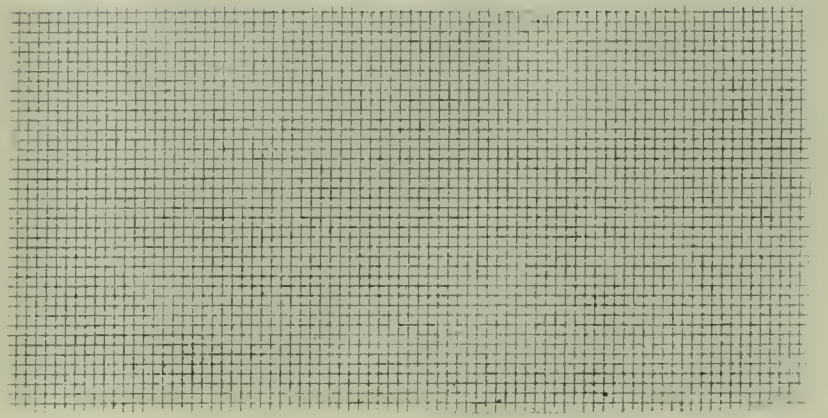
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

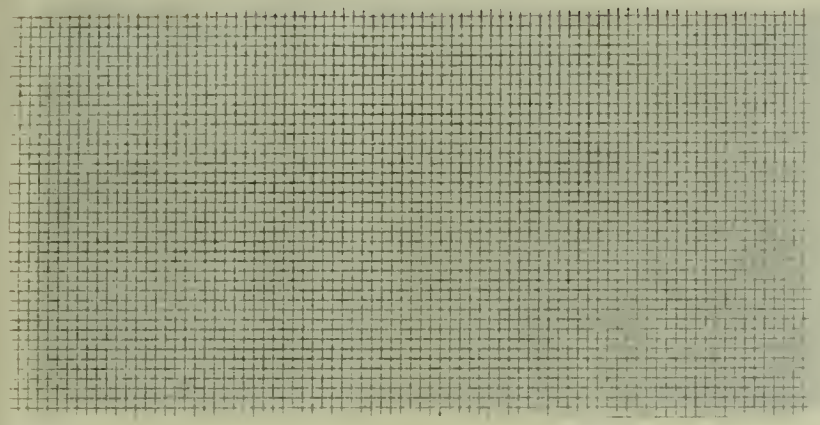
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

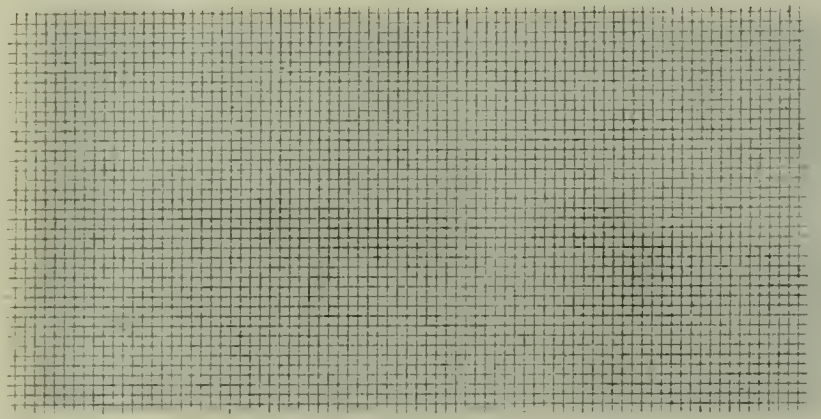
BLACK, WEFT. WHITE, WARP.



DESIGN Nº.

SHAFTS PICKS TO THE ROUND.

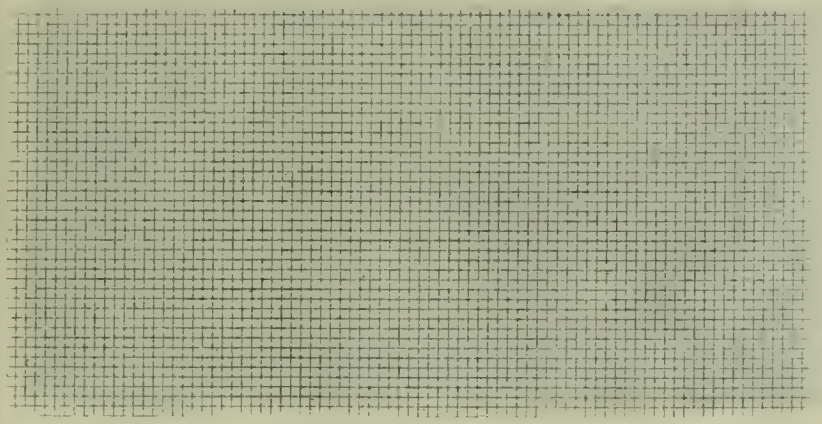
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

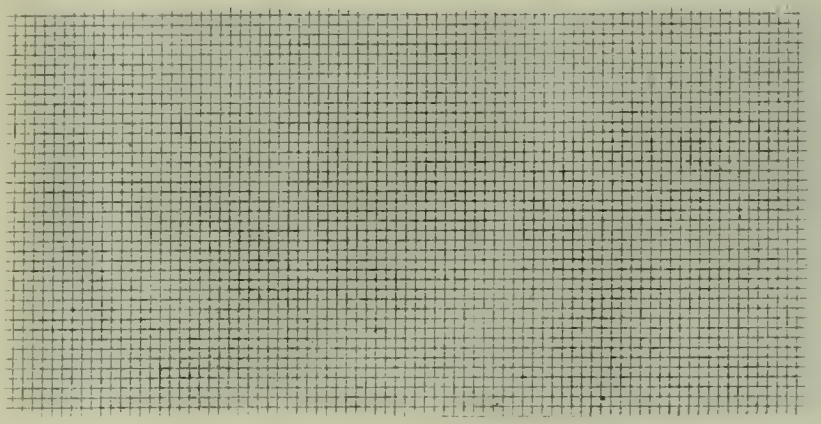
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN No

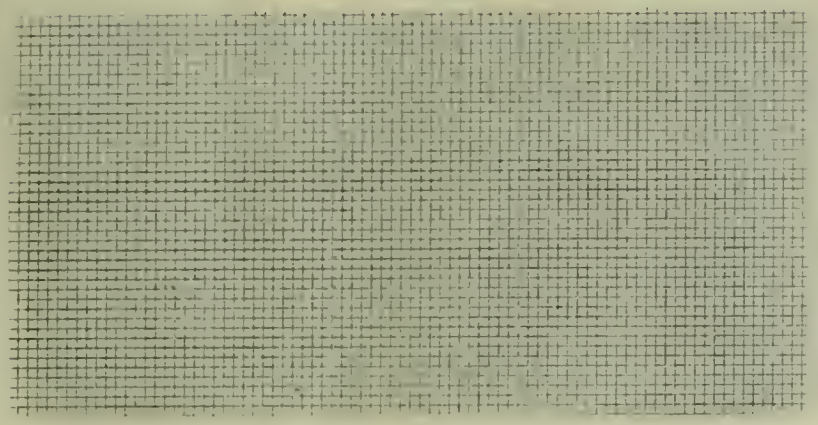
SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

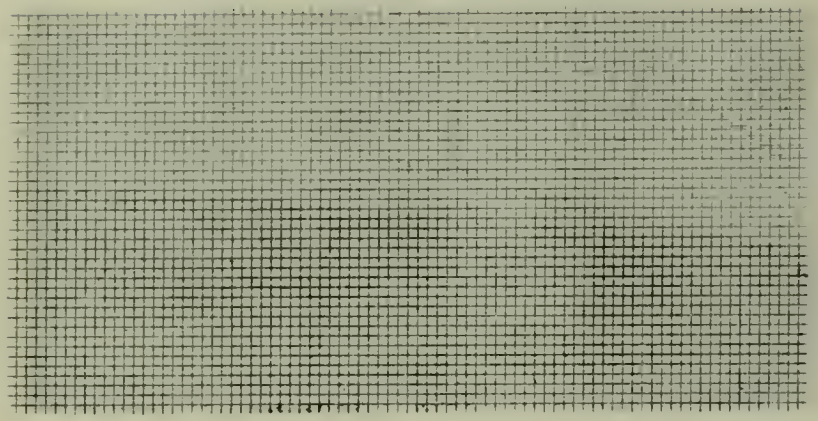
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS. PICKS TO THE ROUND.

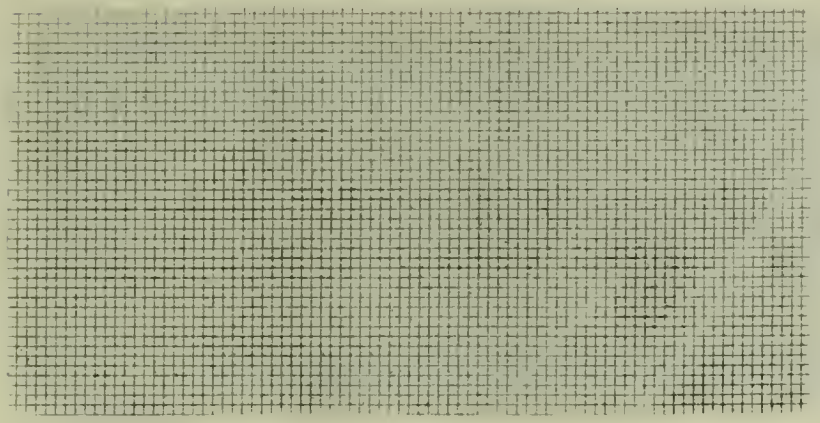
BLACK, WEFT. WHITE. WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

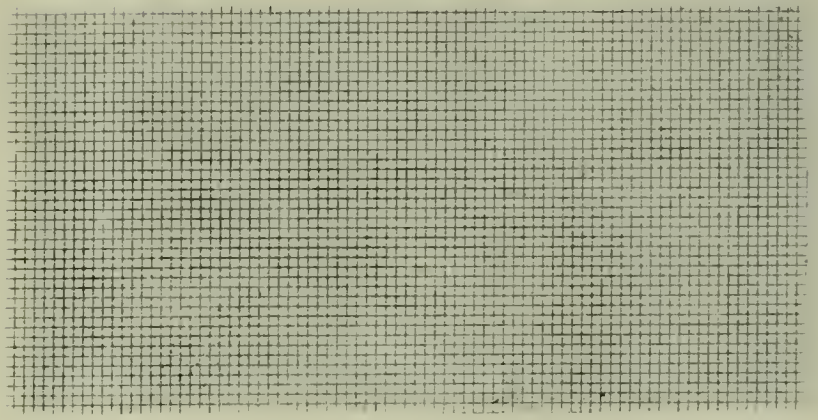
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No.

SHAFTS PICKS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN No.

SHAFTS PICKS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN No.

SHAFTS PICKS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN No.

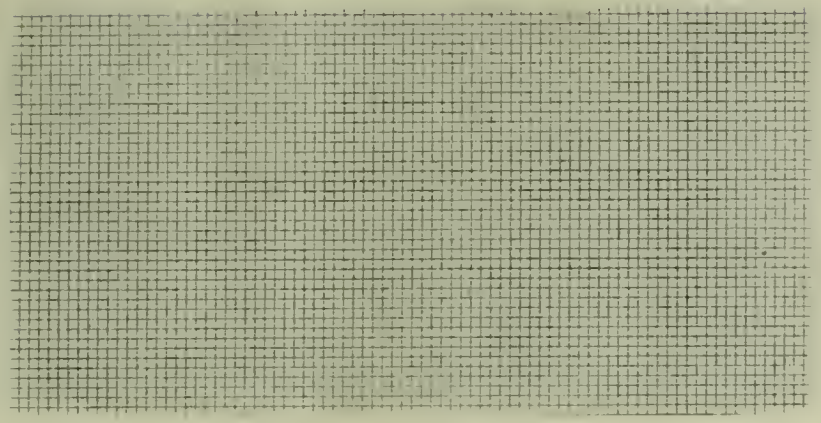
SHAFTS PICKS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

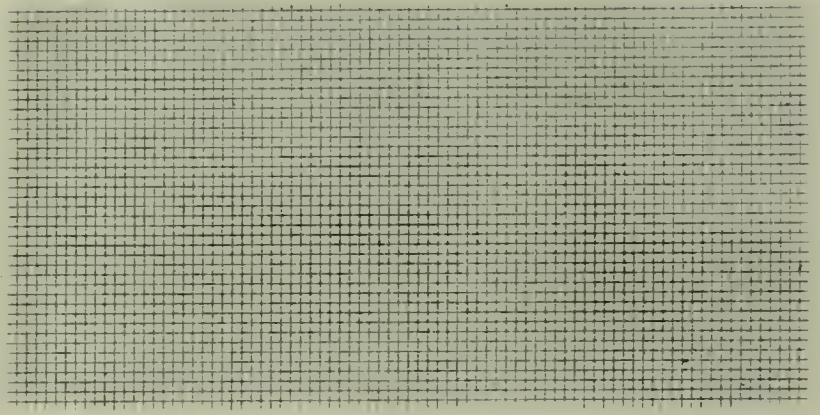
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

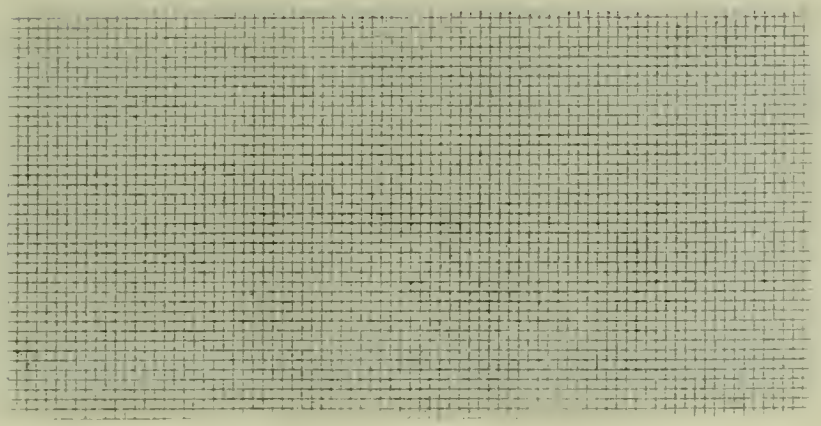
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

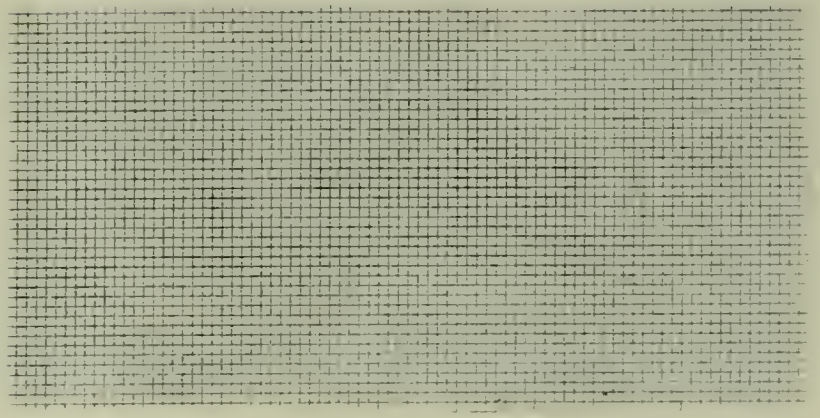
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

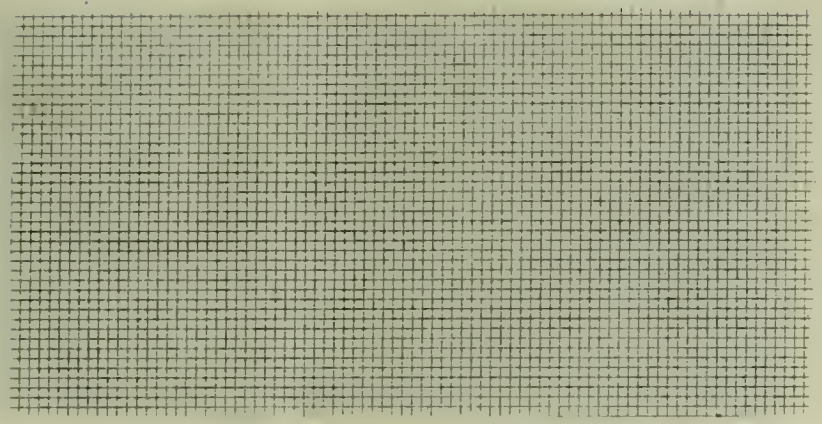
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS - PICKS TO THE ROUND

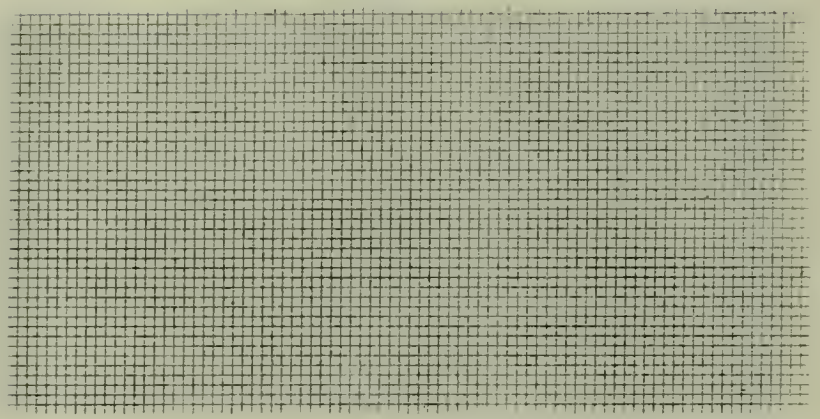
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

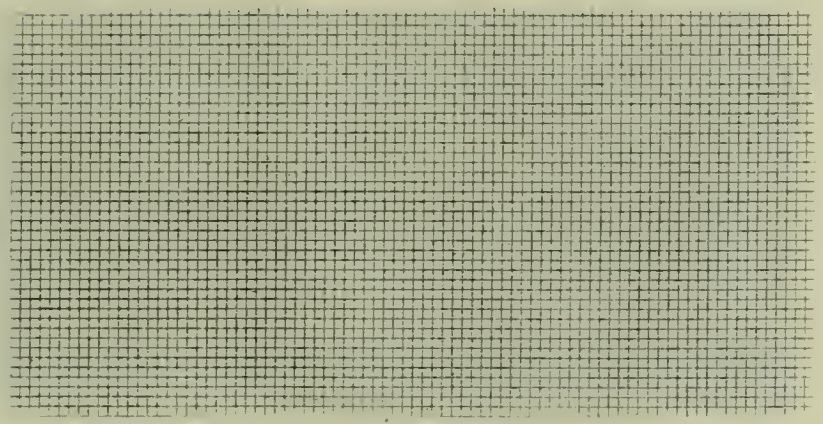
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

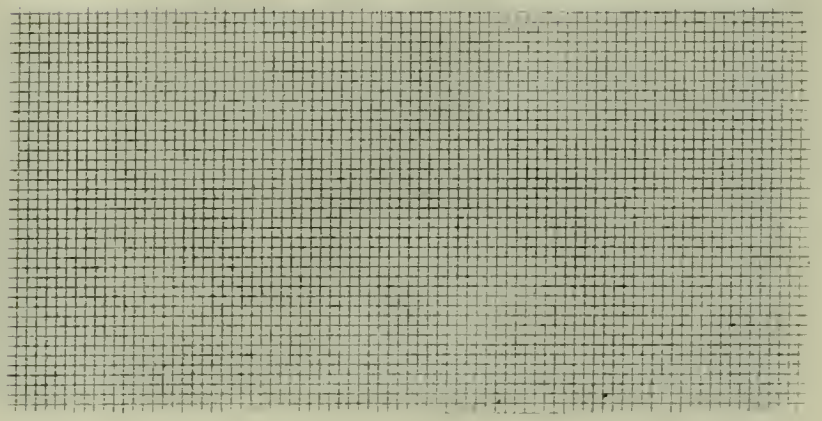
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

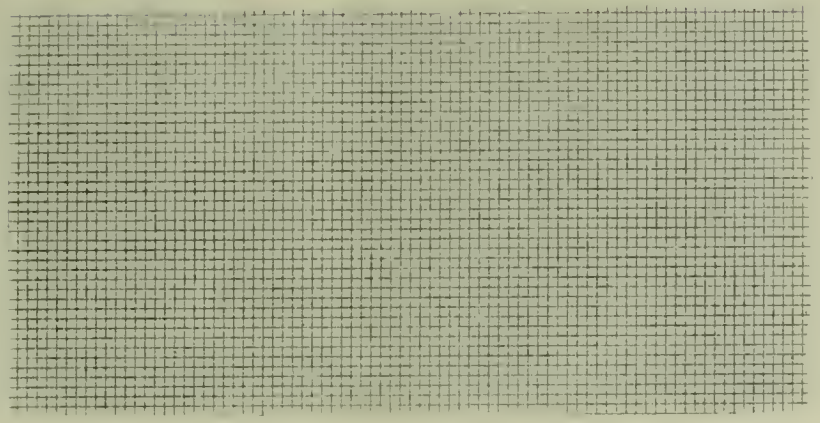
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

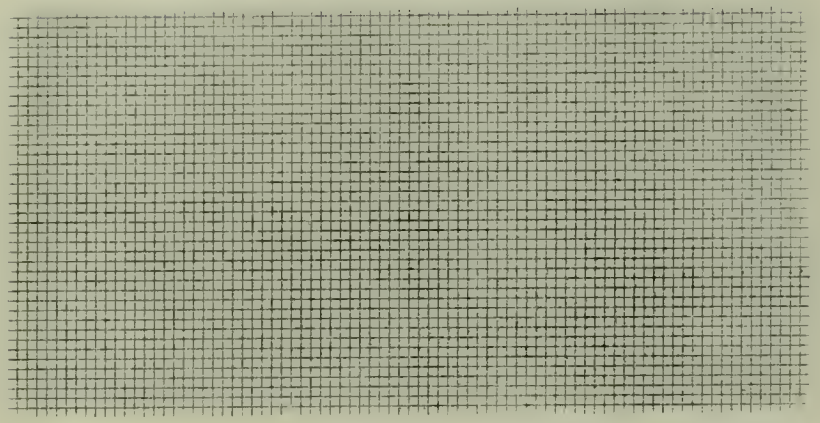
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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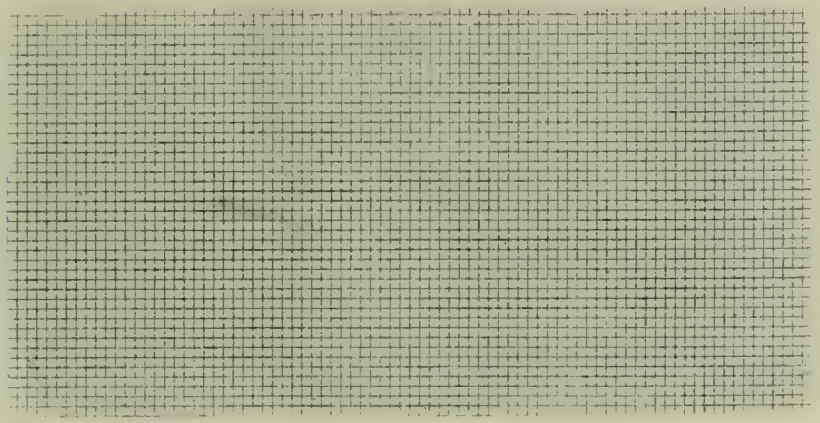
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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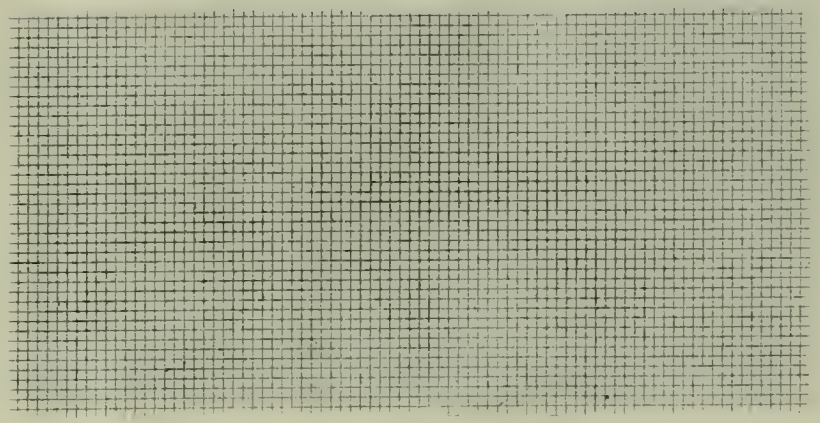
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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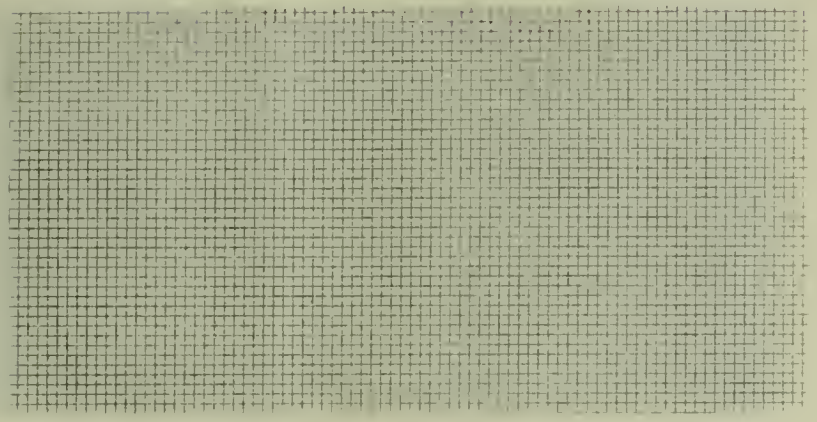
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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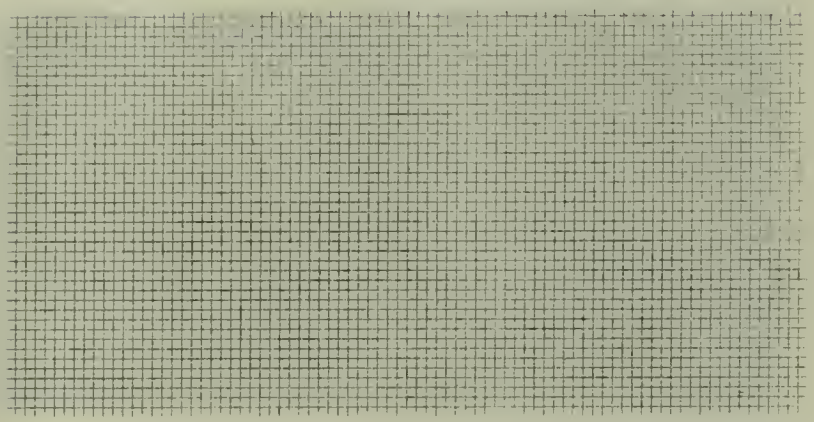
SHAFTS PICKS TO THE ROUND.

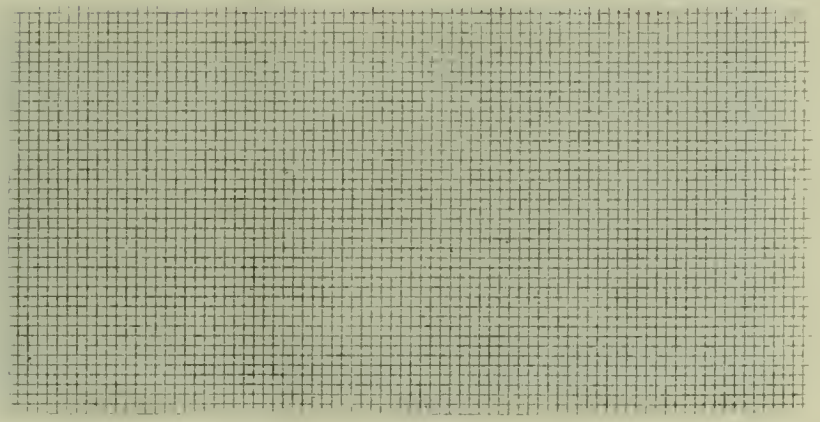
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

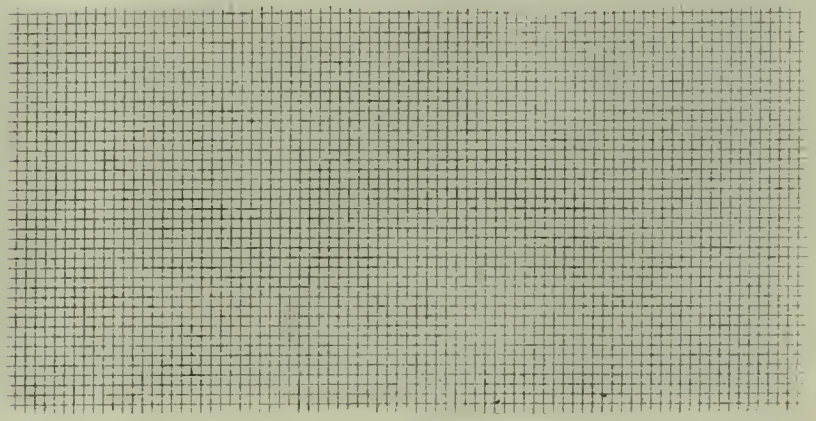
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

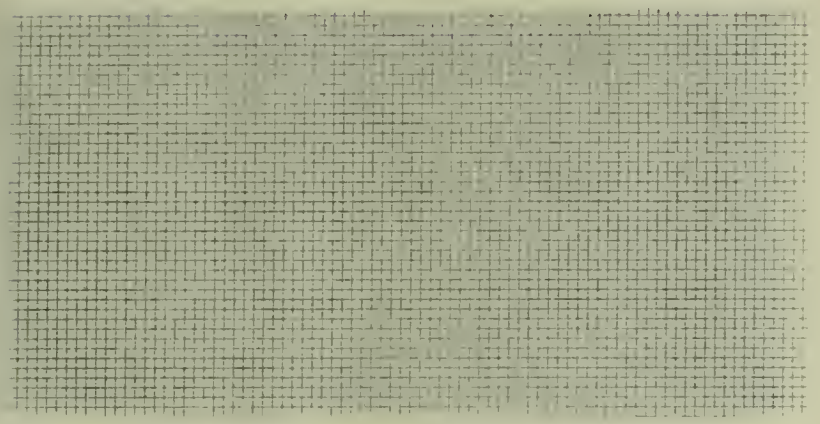
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

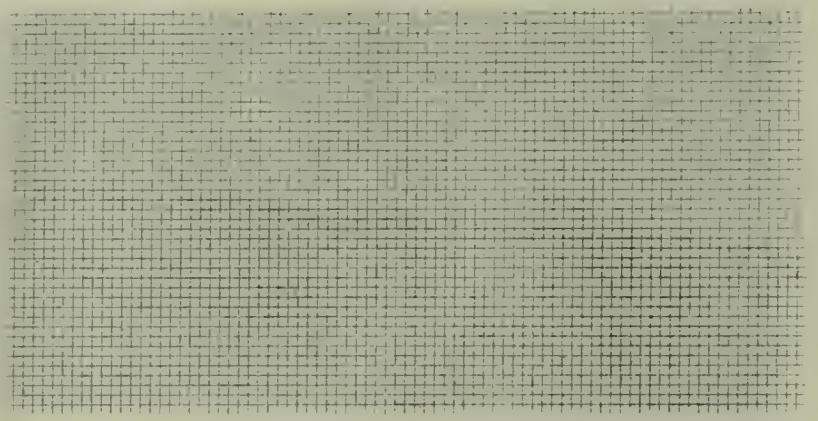
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

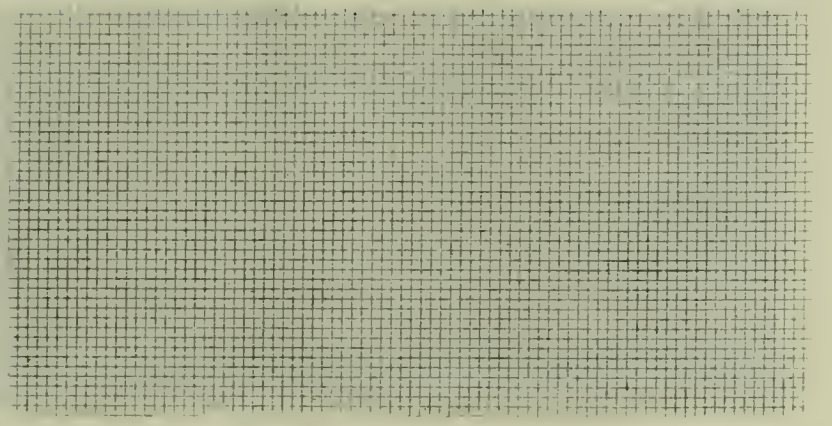
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

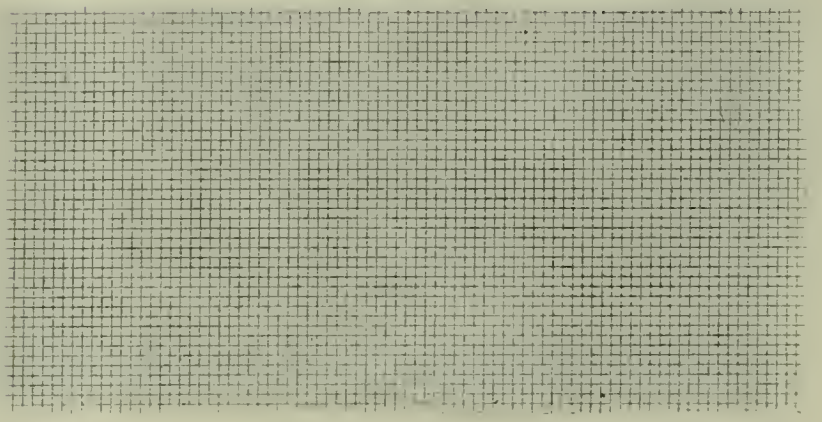
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

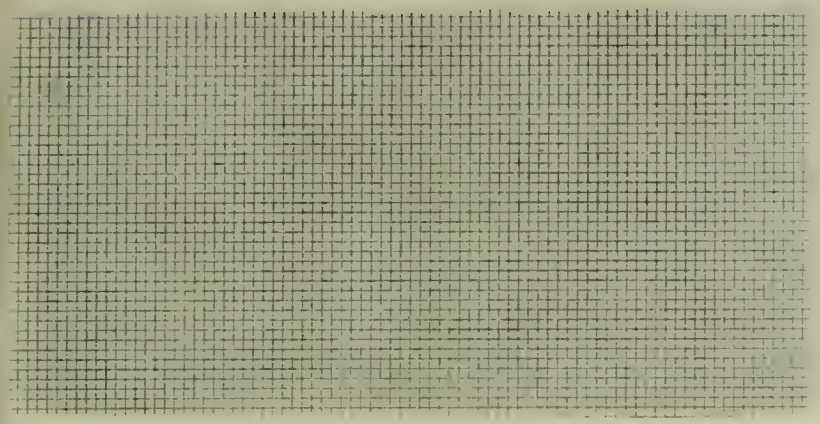
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

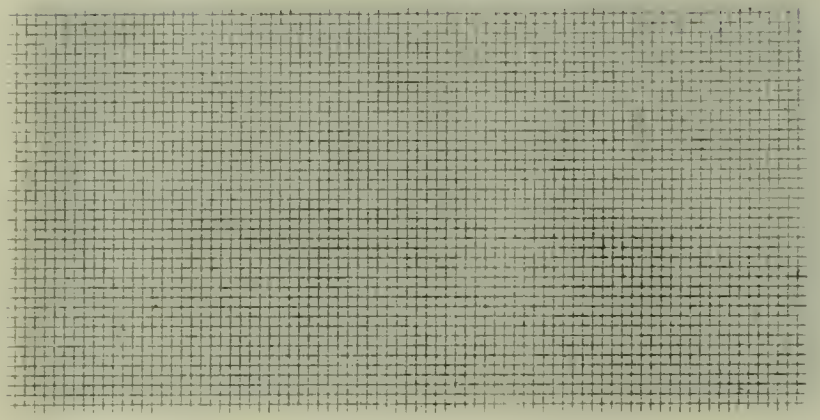
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

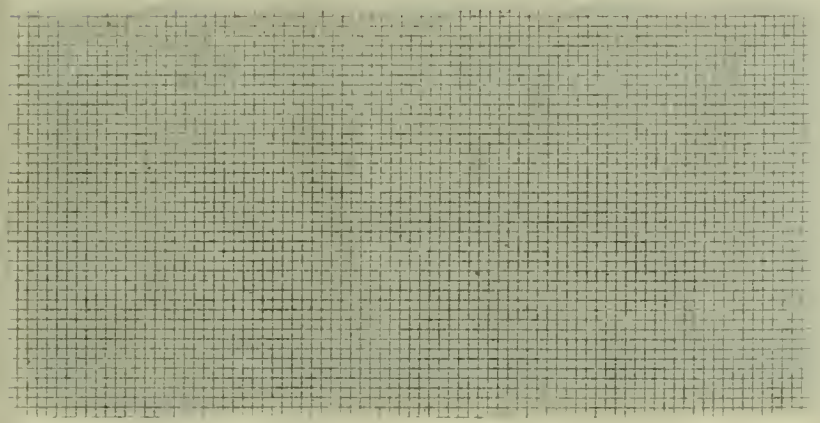
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

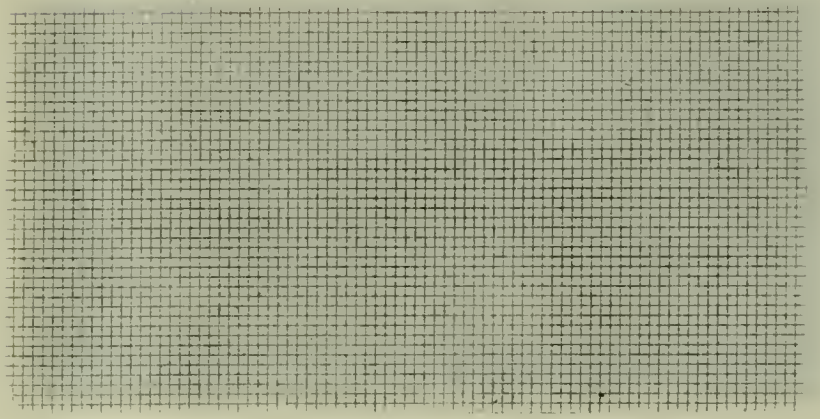
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN No

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

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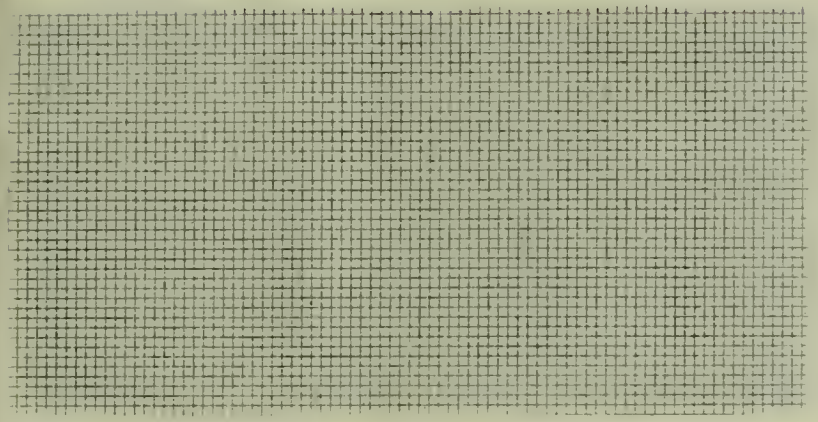
SHAFTS PICKS TO THE ROUND.

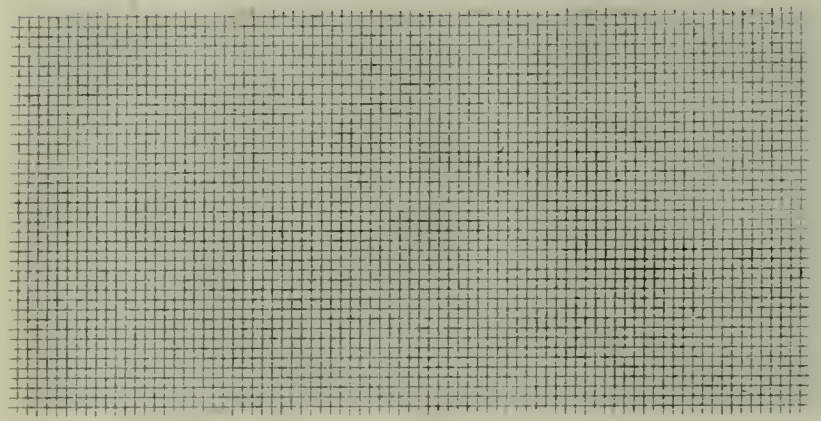
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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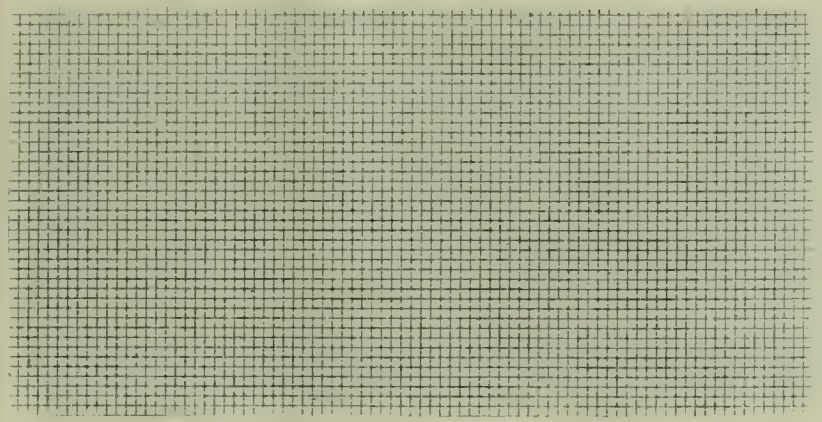
SHAFTS PICKS TO THE ROUND.

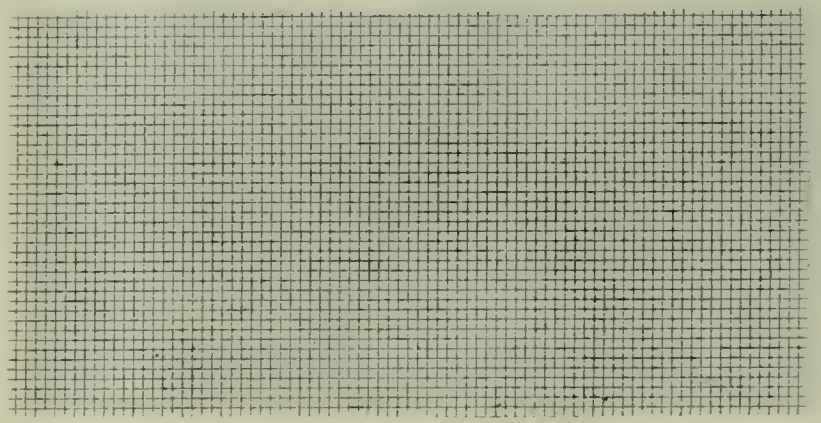
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

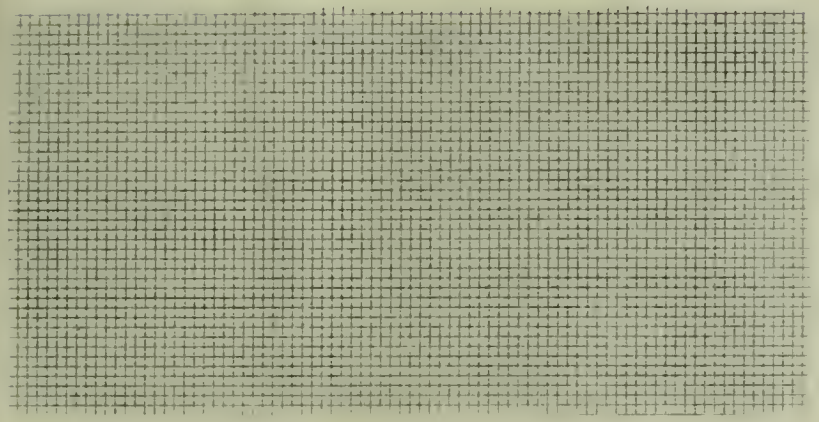
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

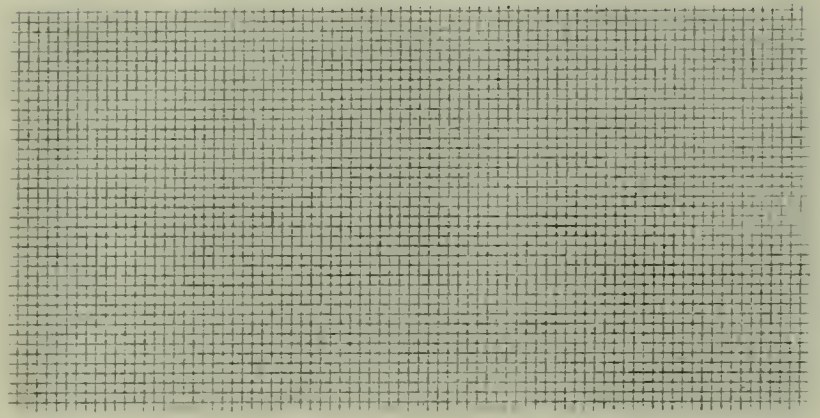
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

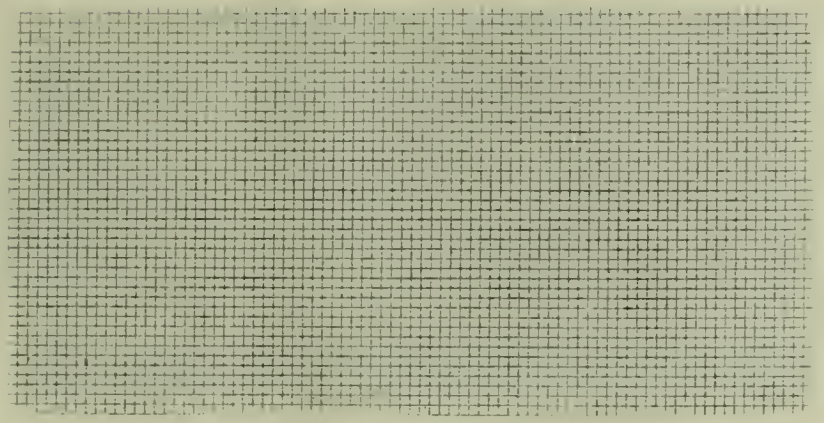
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

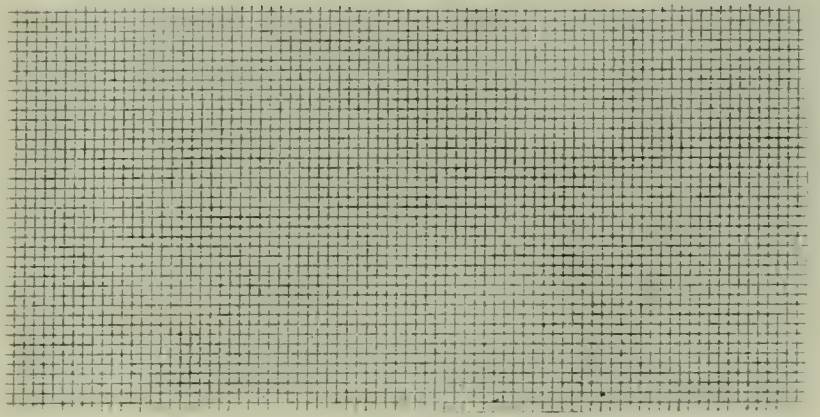
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



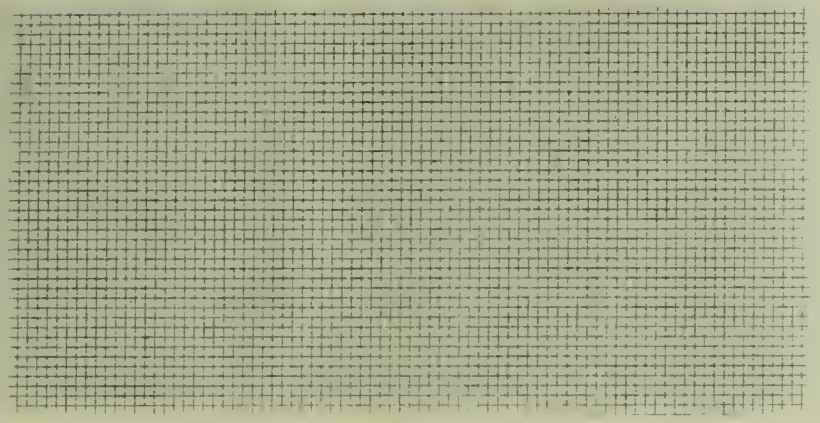
SHAFTS PICKS TO THE ROUND

BLACK. WEFT. WHITE. WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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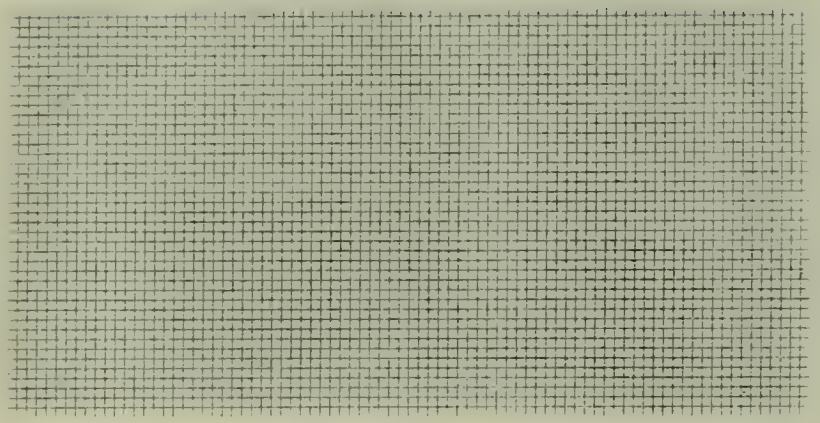
SHAFTS PICKS TO THE ROUND.

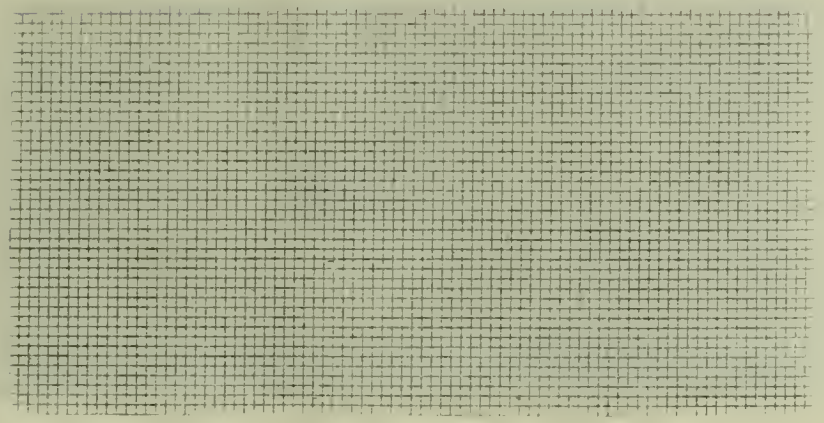
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



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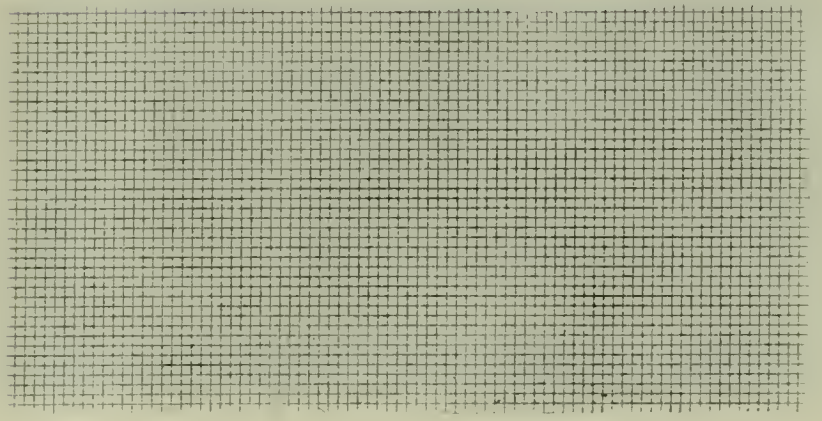
SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



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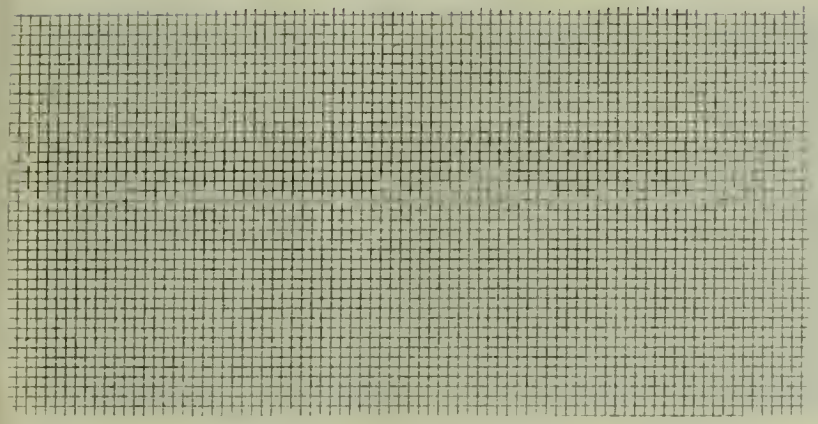
BLACK, WEFT. WHITE, WARP.



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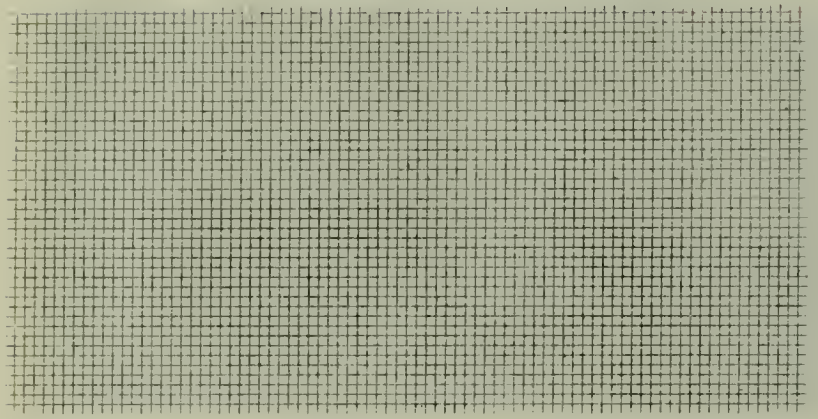
BLACK, WEFT. WHITE, WARP.



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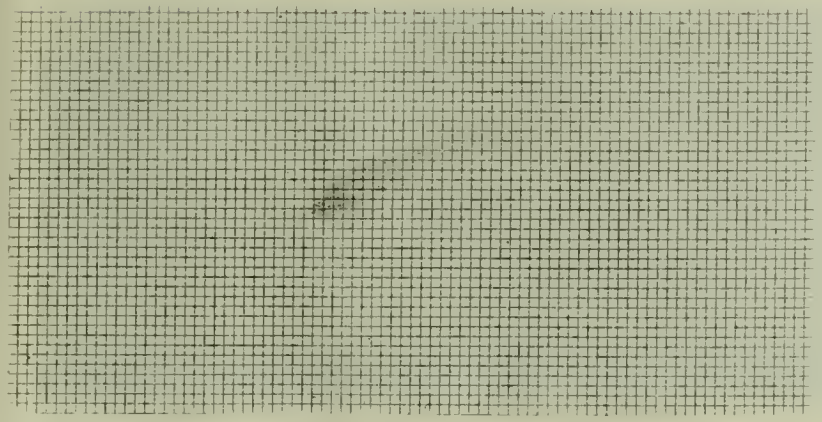
BLACK, WEFT. WHITE, WARP.



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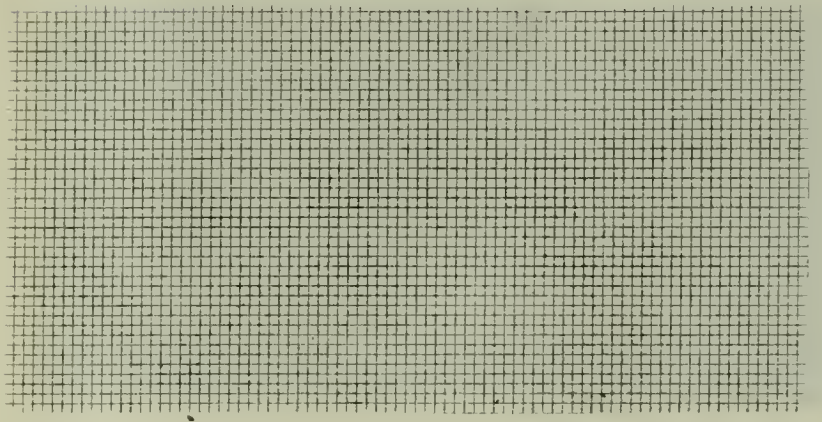
BLACK, WEFT. WHITE, WARP.



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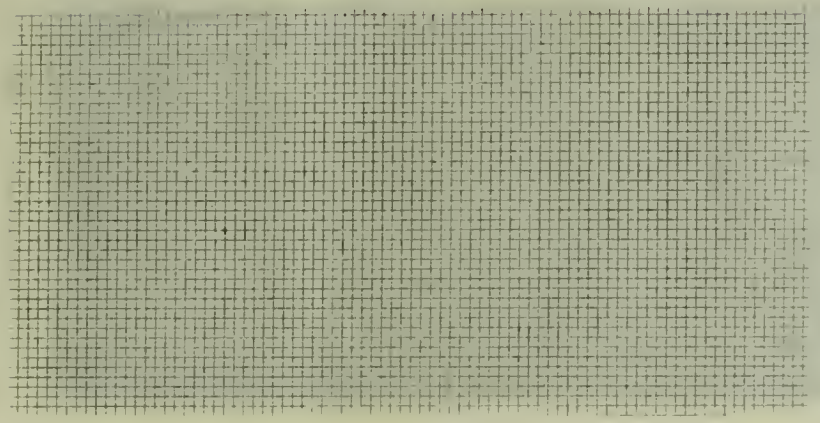
BLACK, WEFT. WHITE, WARP.



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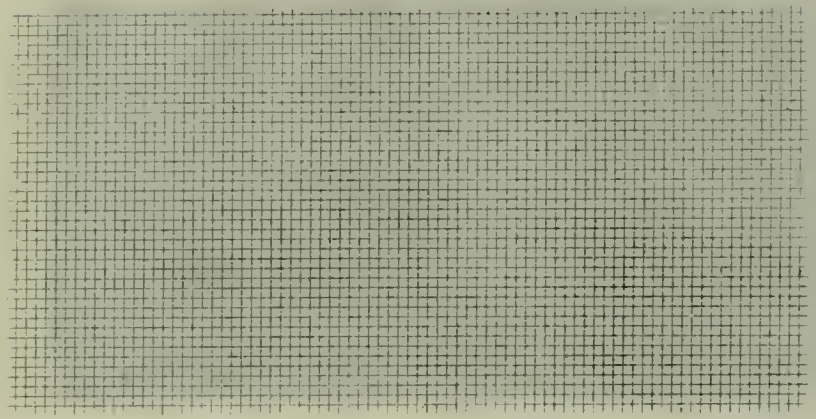
BLACK, WEFT. WHITE, WARP.



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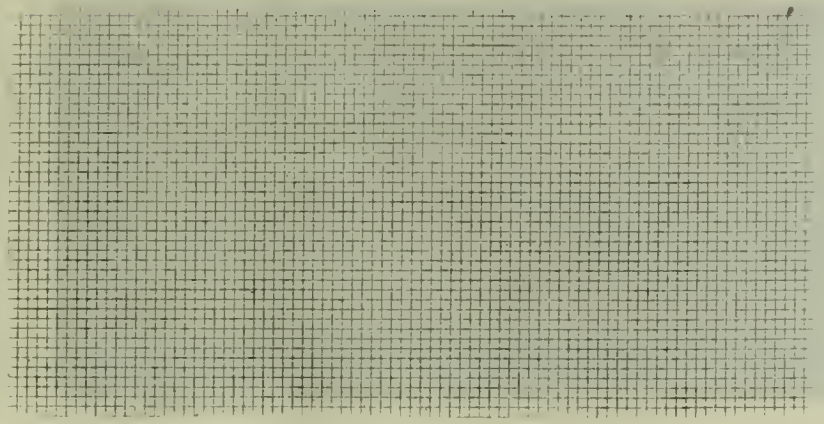
BLACK, WEFT. WHITE, WARP.



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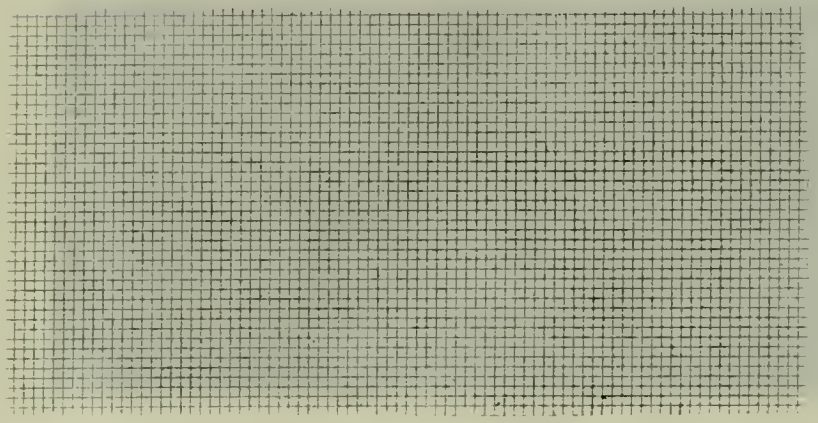

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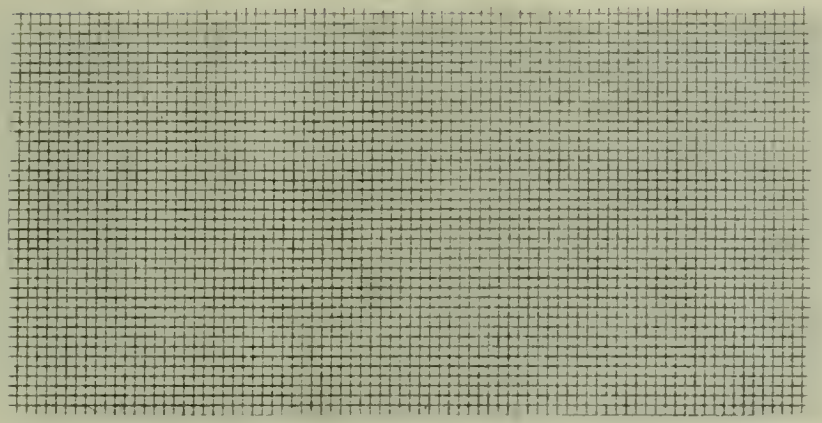

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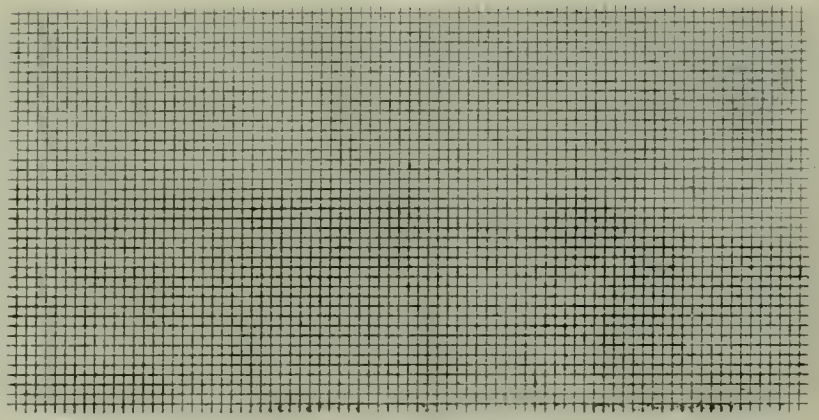

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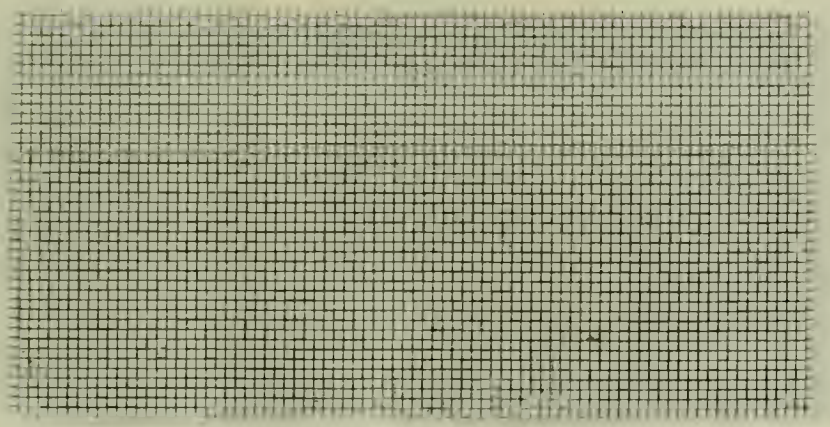

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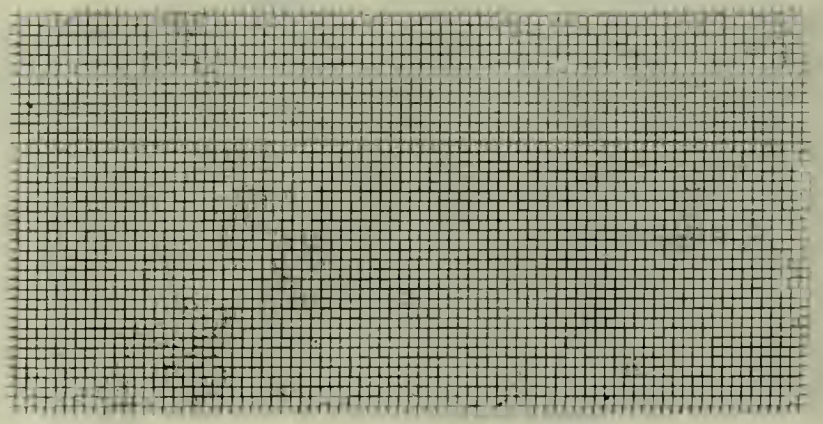
BLACK, WEFT. WHITE, WARP.



DESIGN NO

SHAFTS PICKS TO THE ROUND

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SHAFTS PICKS TO THE ROUND.

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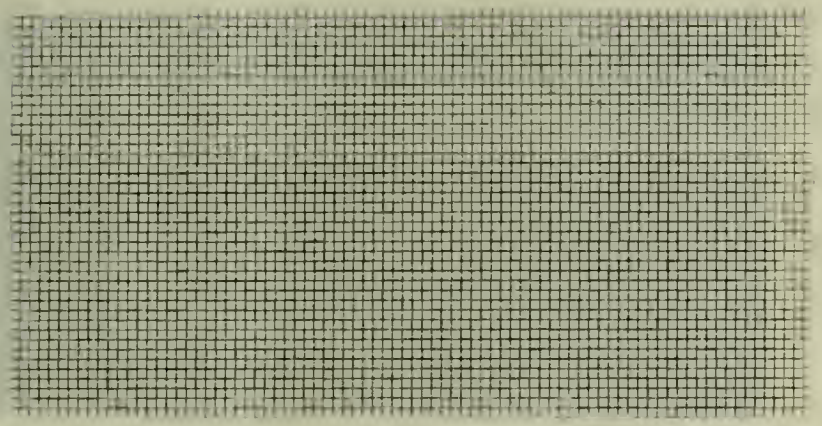

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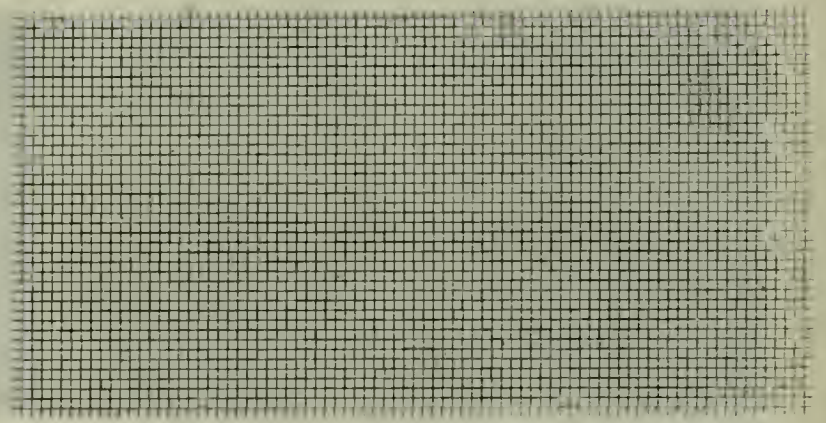
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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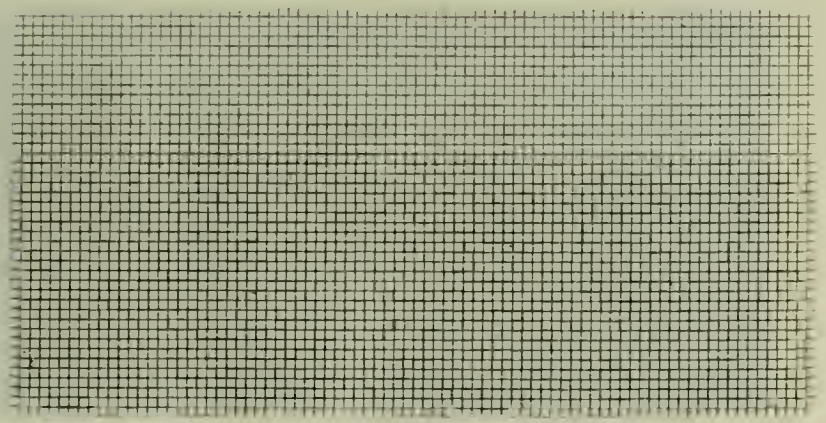

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SHAFTS PICKS TO THE ROUND.

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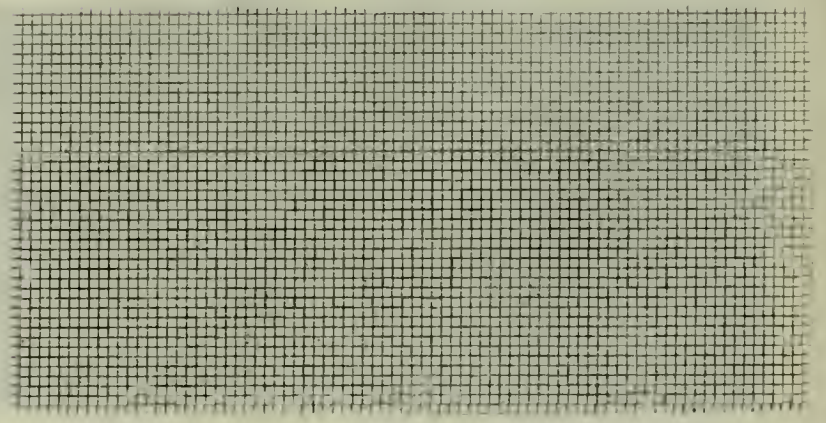

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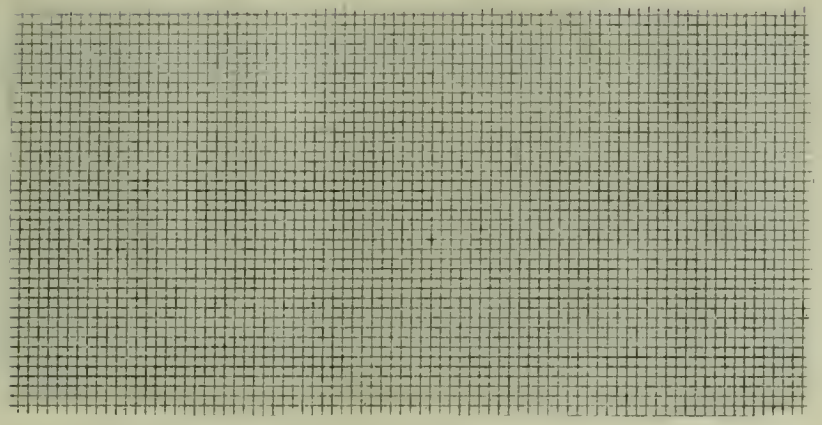

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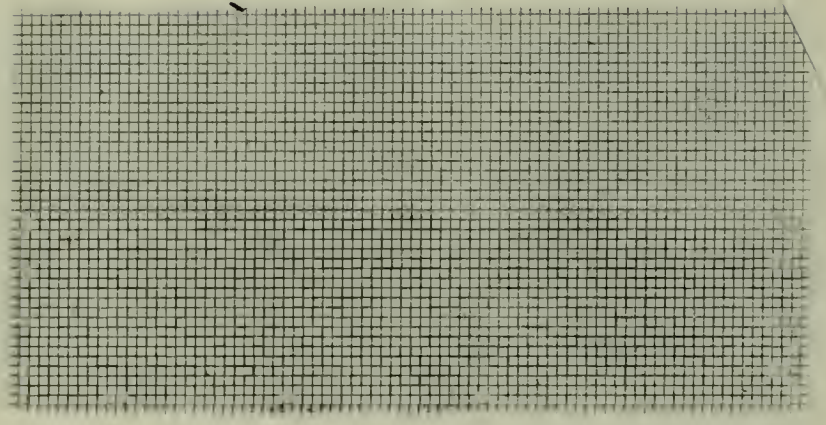

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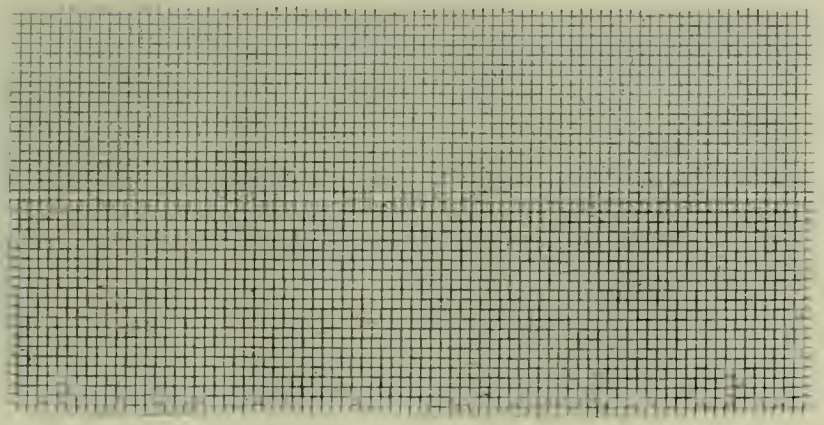

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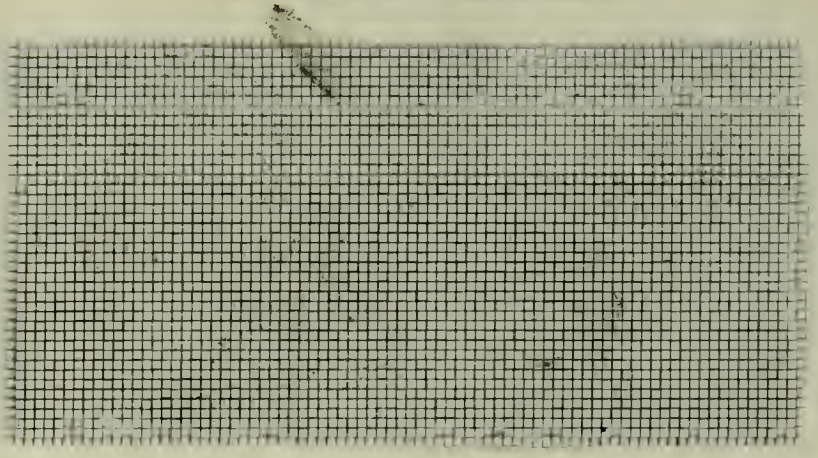

DESIGN No

SHAFTS PICKS TO THE ROUND

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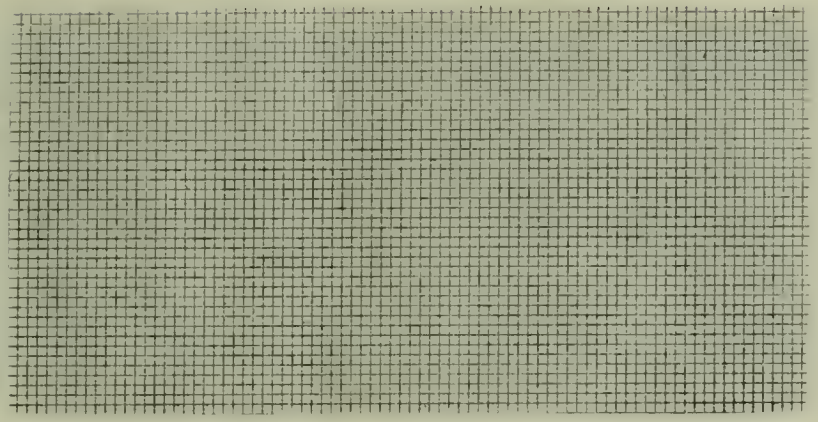
BLACK, WEFT. WHITE, WARP.



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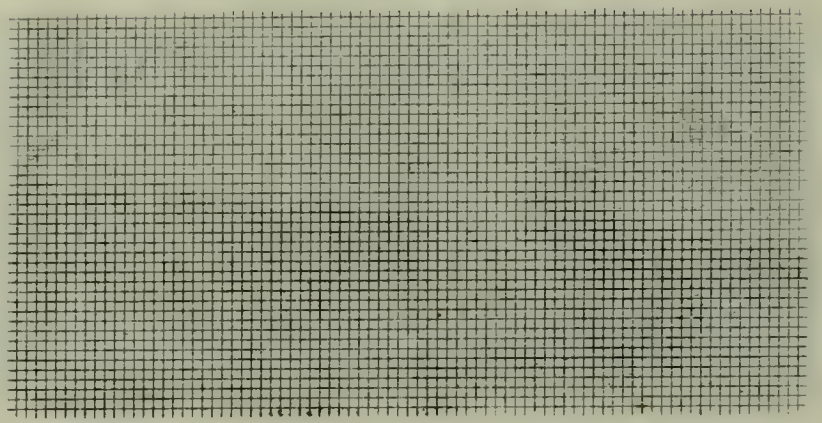

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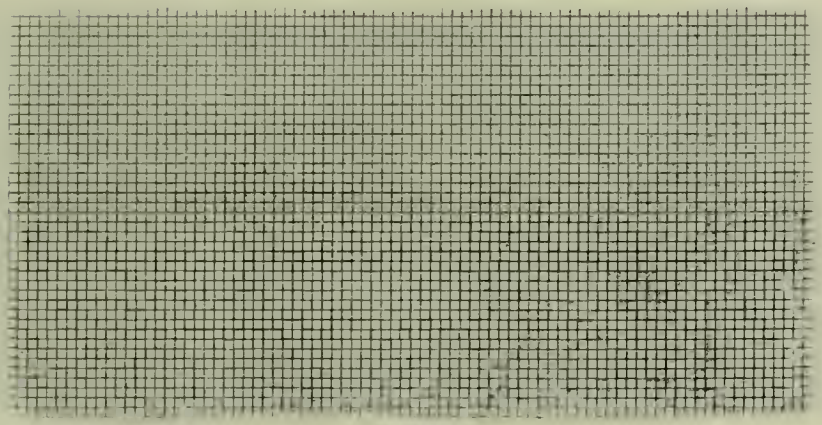

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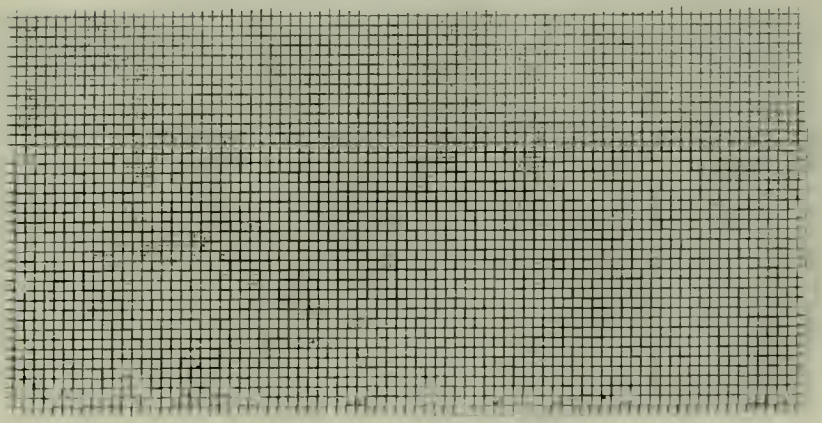
BLACK, WEFT. WHITE, WARP.



SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

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SHAFTS PICKS TO THE ROUND

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SHAFTS PICKS TO THE ROUND

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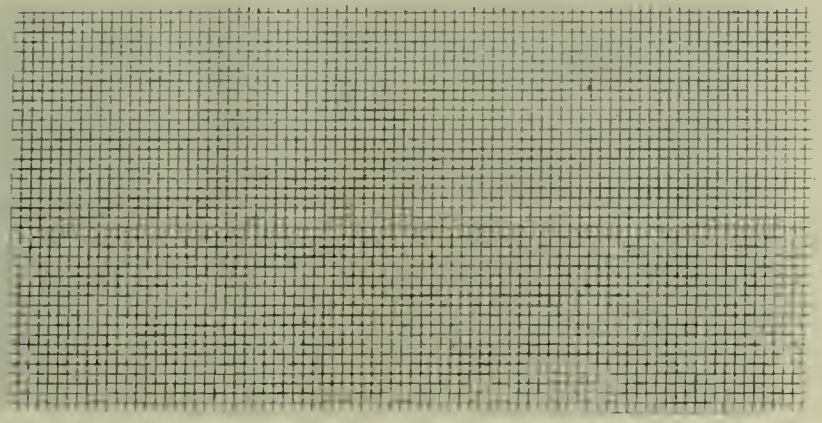

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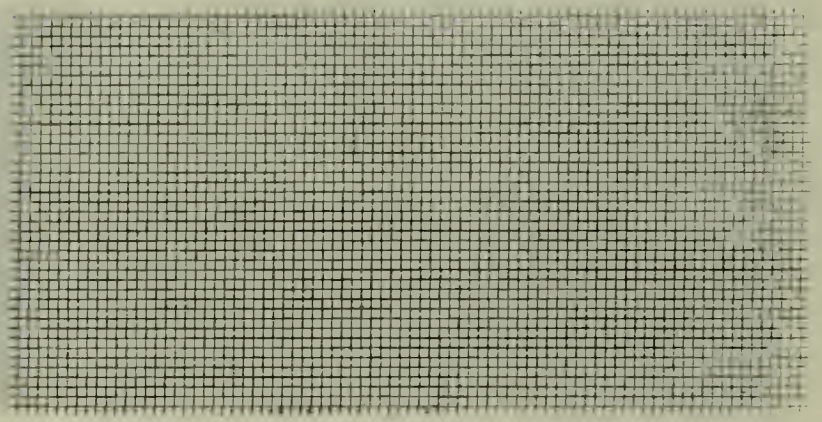

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SHAFTS PICKS TO THE ROUND

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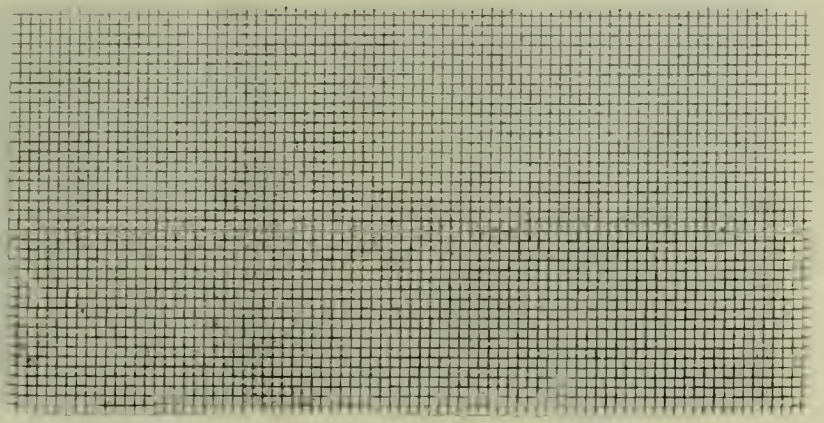

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SHAFTS PICKS TO THE ROUND

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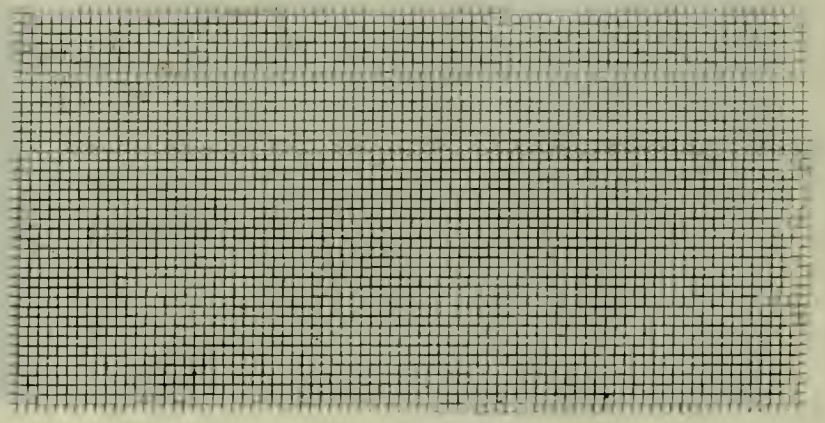
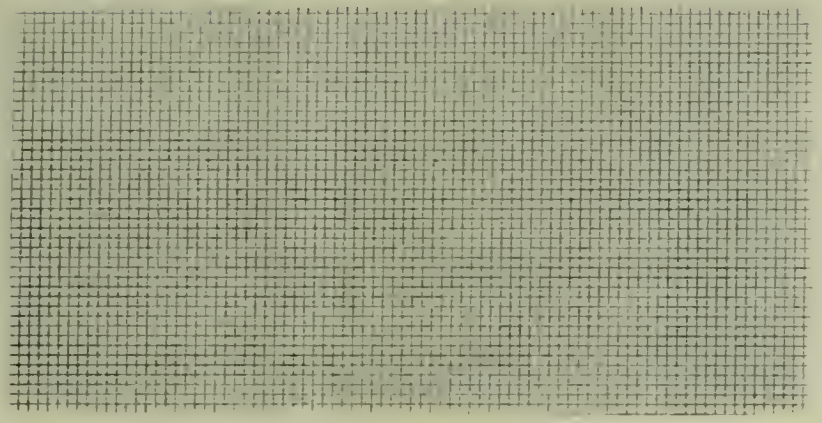


DESIGN Nº

SHAFTS PICKS TO THE ROUND.

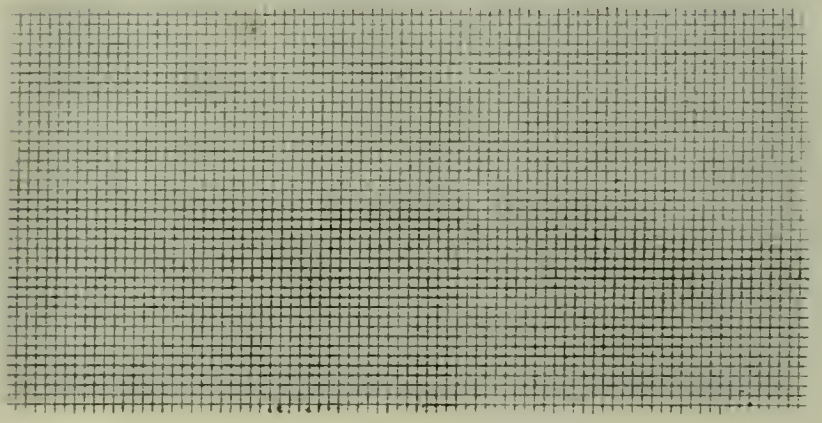
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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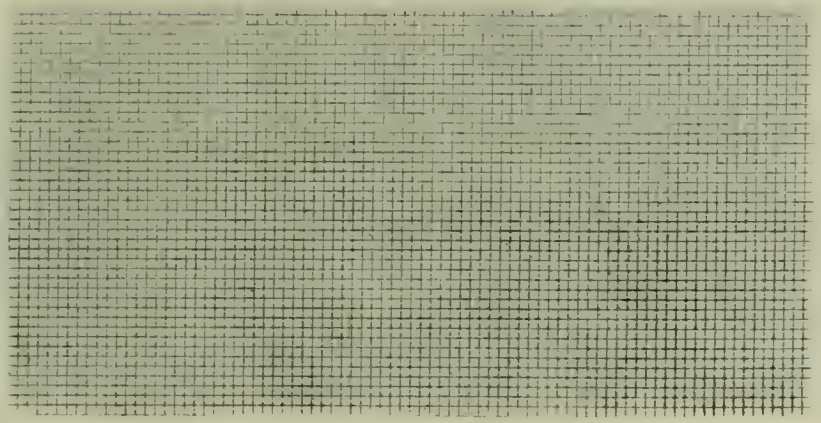
SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



DESIGN Nº

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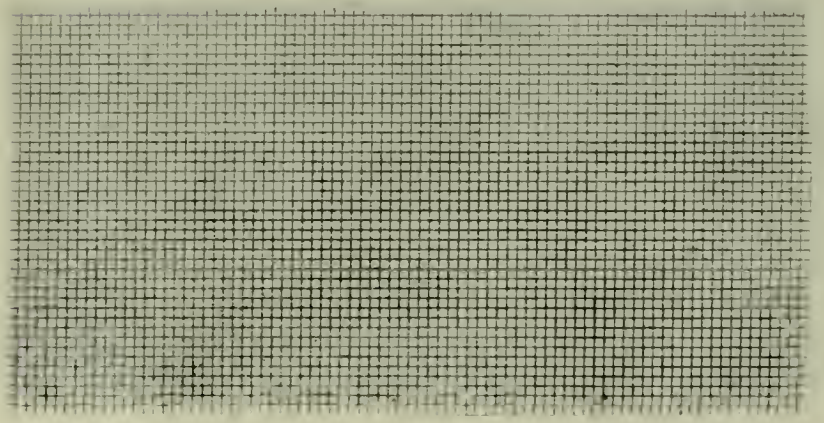
BLACK, WEFT. WHITE, WARP.



DESIGN No

SHAFTS PICKS TO THE ROUND

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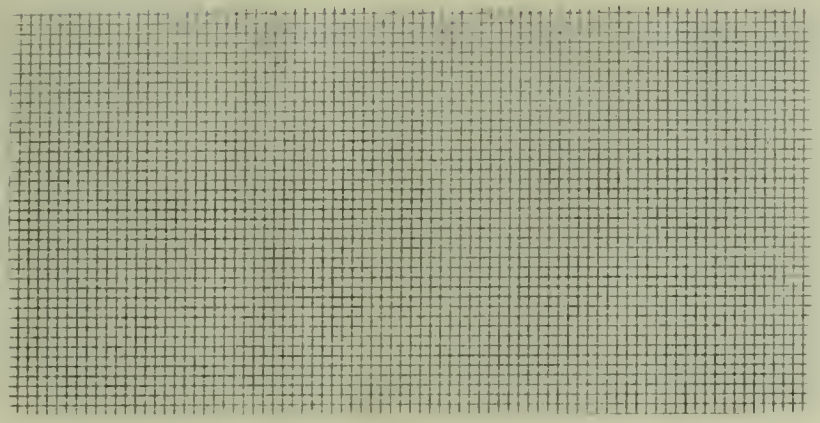
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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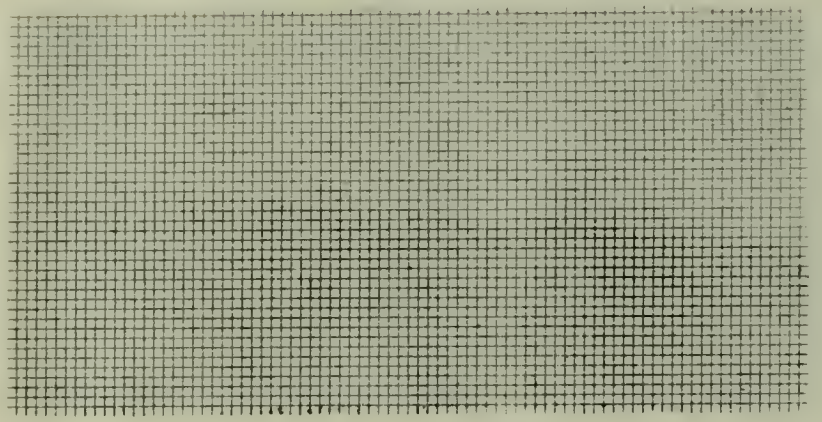

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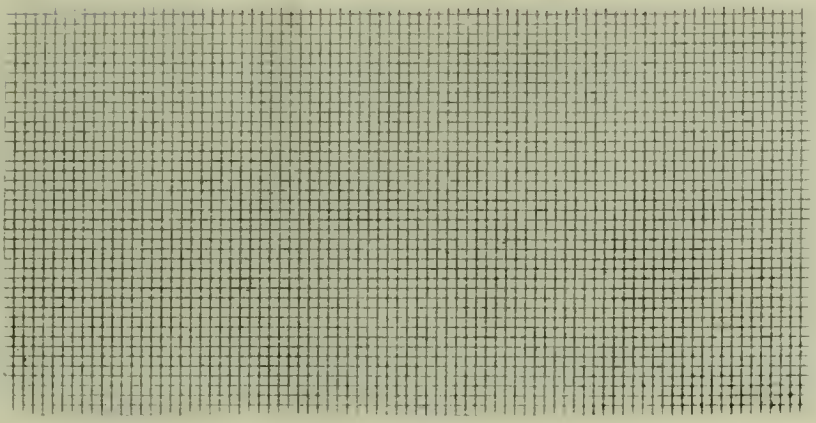

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SHAFTS PICKS TO THE ROUND.

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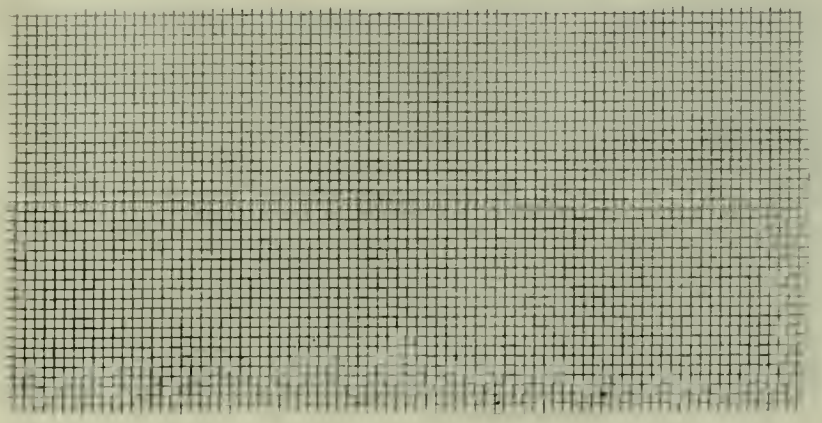

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SHAFTS PICKS TO THE ROUND.

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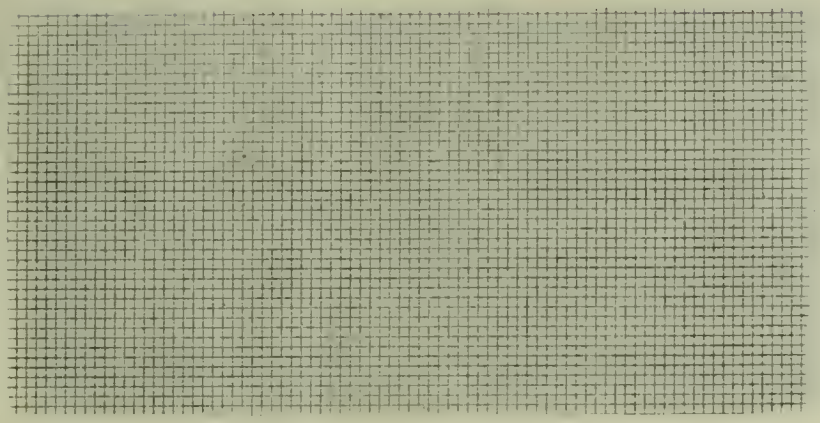

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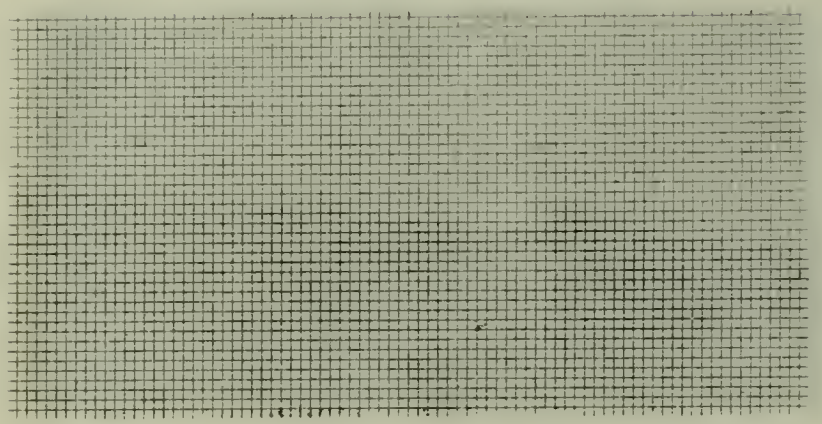
SHAFTS PICKS TO THE ROUND.

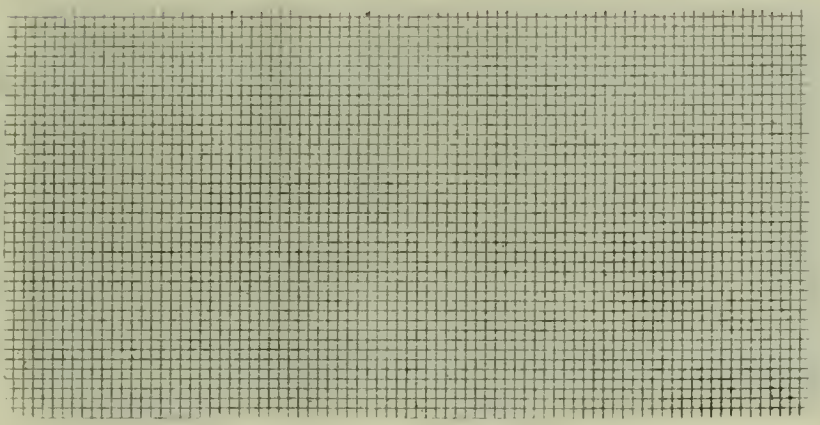
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

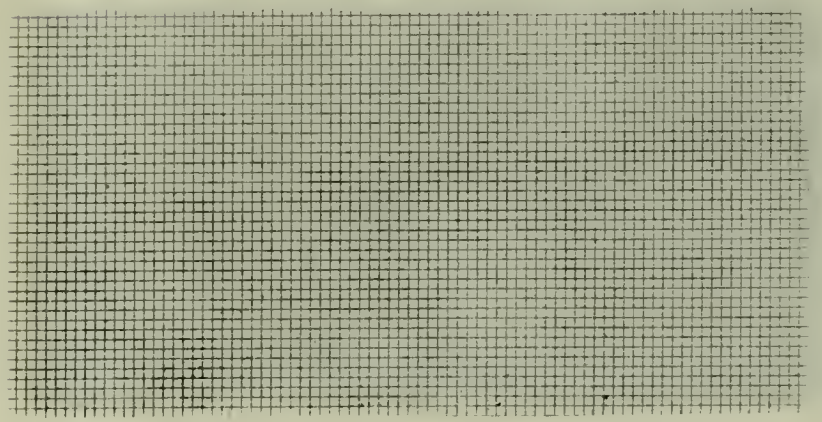
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

BLACK WEFT. WHITE WARP.

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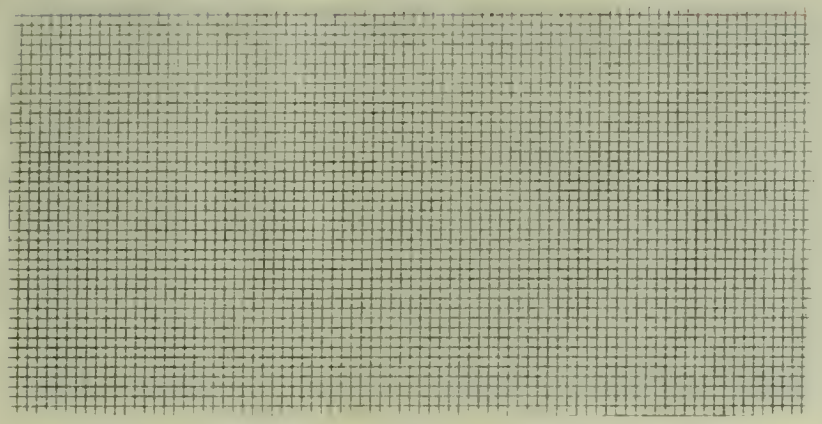
BLACK WEFT. WHITE WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

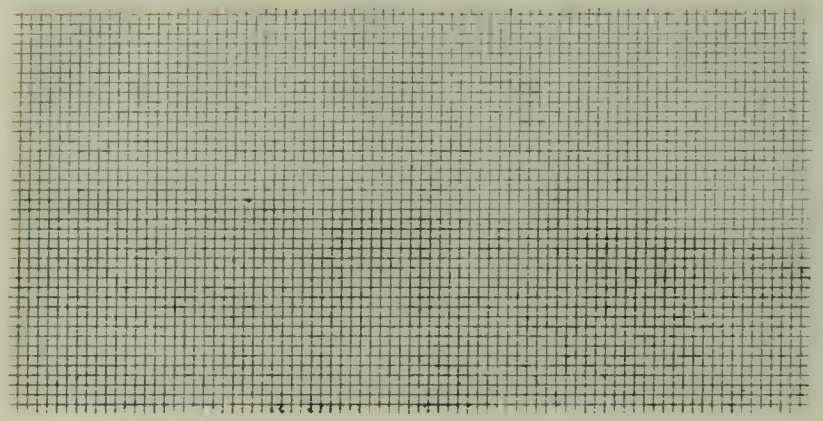
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN Nº

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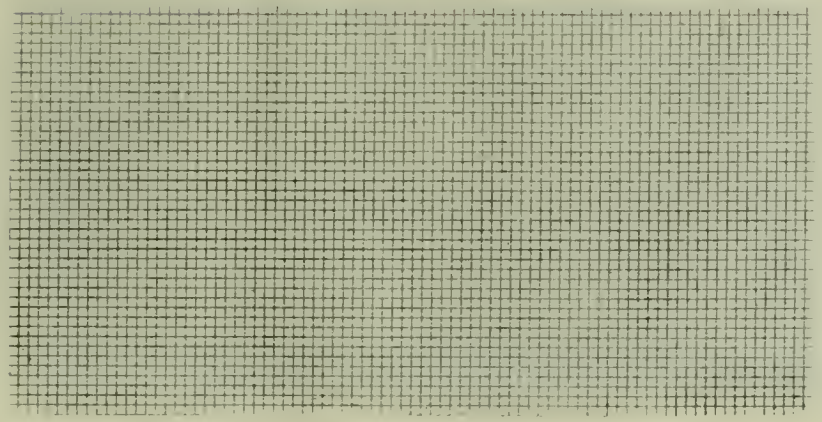
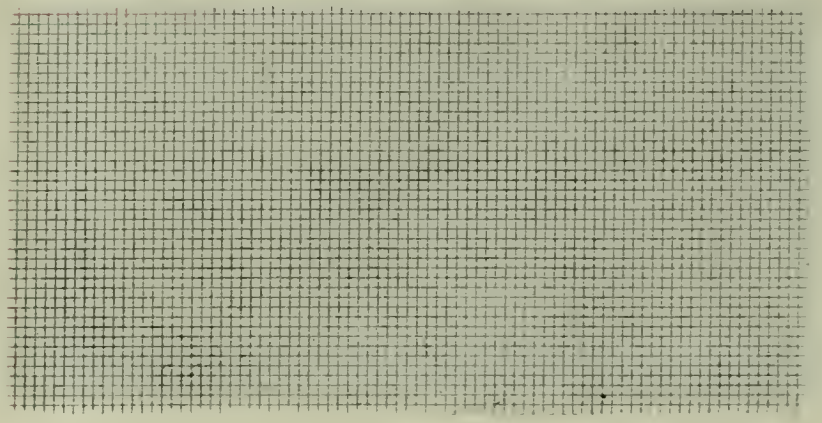
BLACK. WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

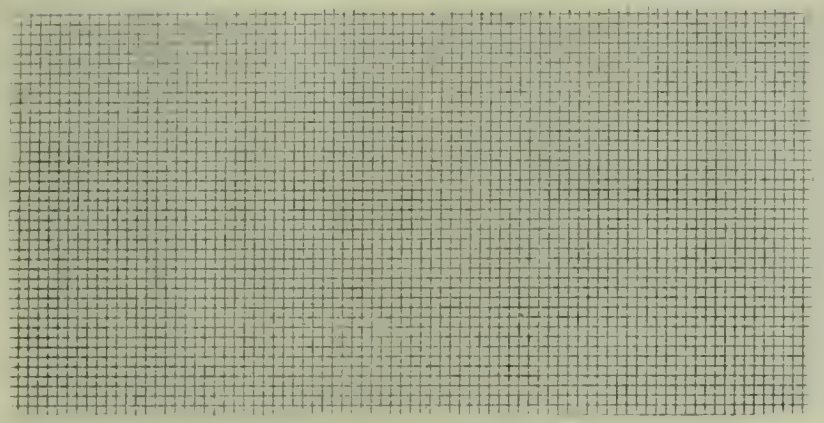
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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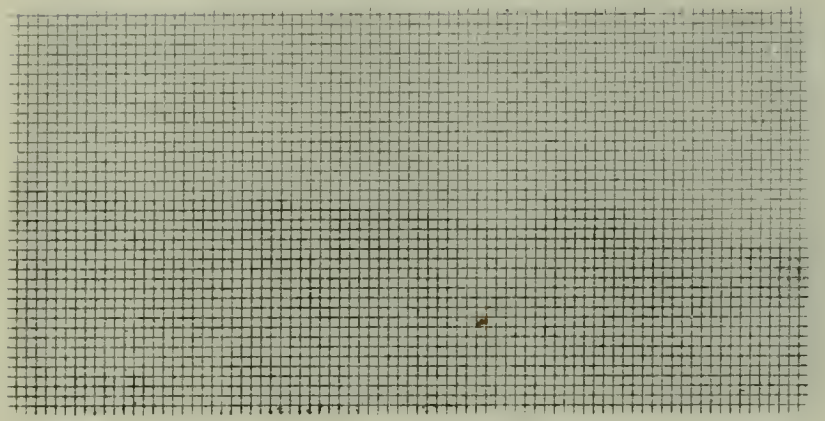
BLACK, WEFT. WHITE, WARP.



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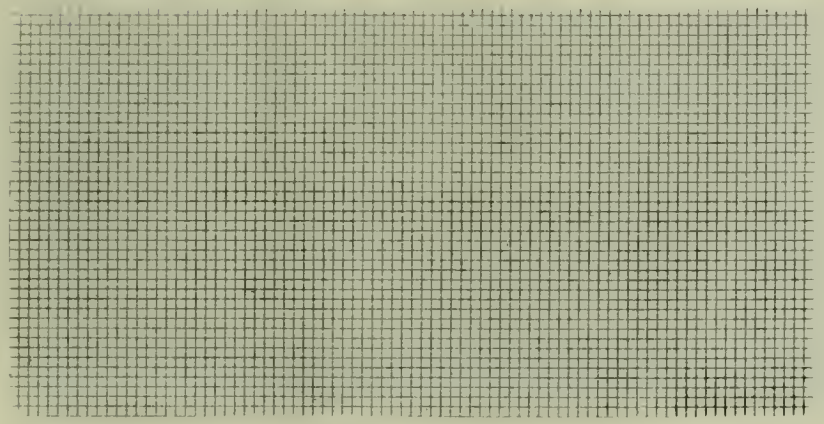
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

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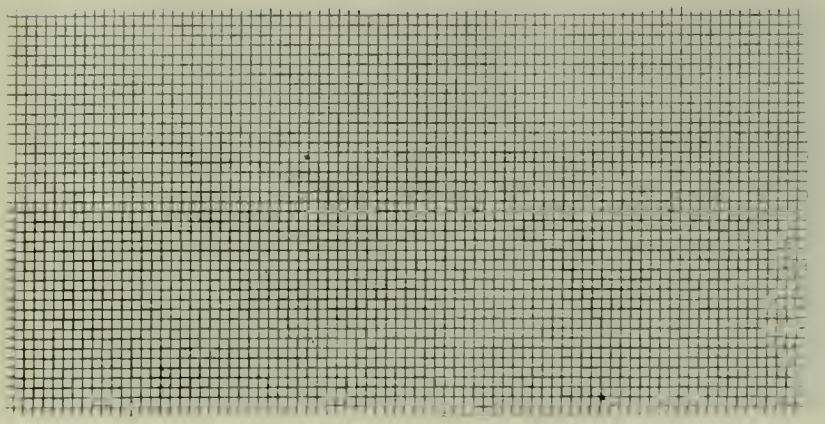
BLACK, WEFT. WHITE, WARP.



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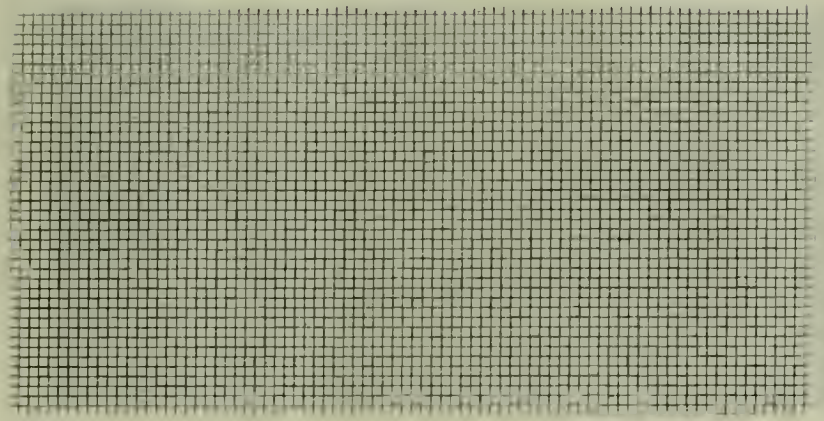

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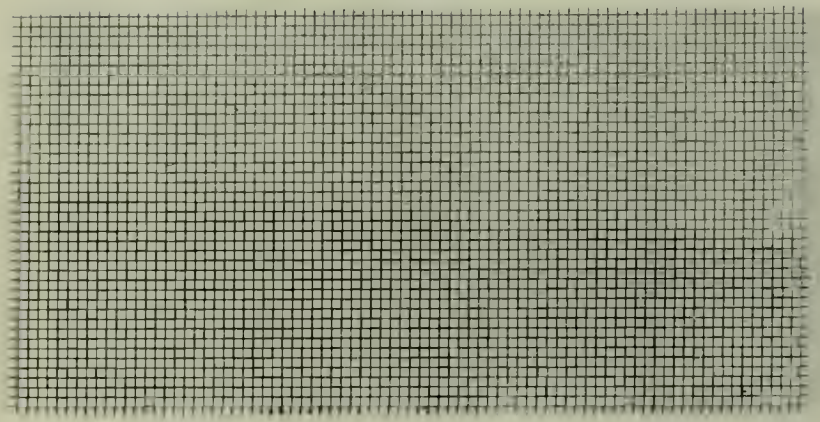
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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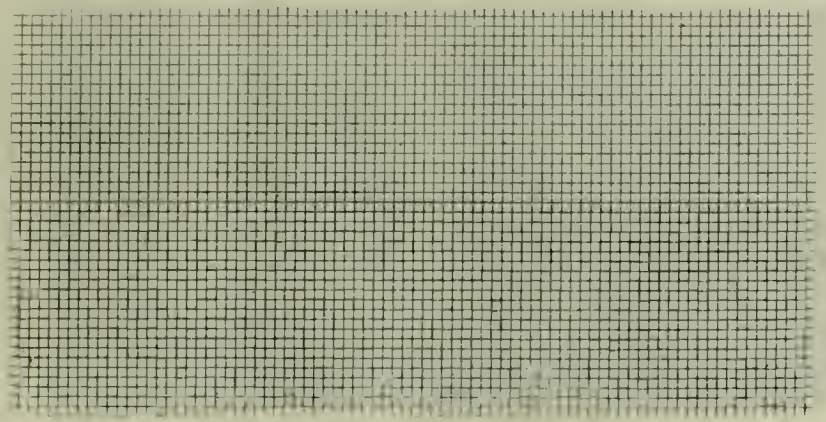
BLACK, WEFT. WHITE, WARP.



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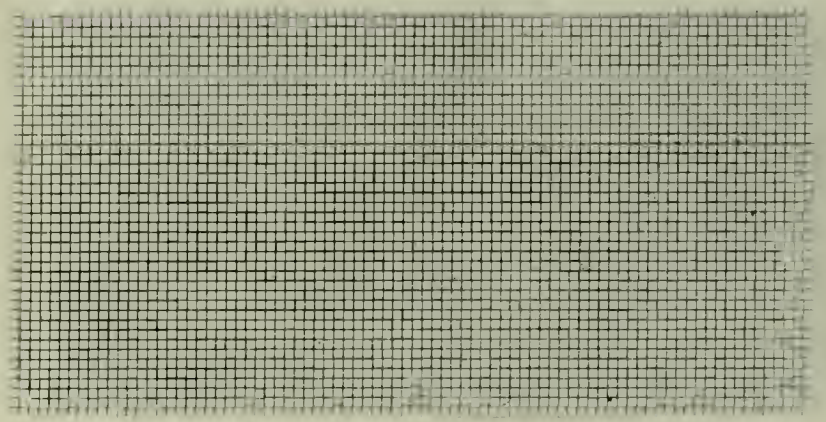
BLACK, WEFT. WHITE, WARP.



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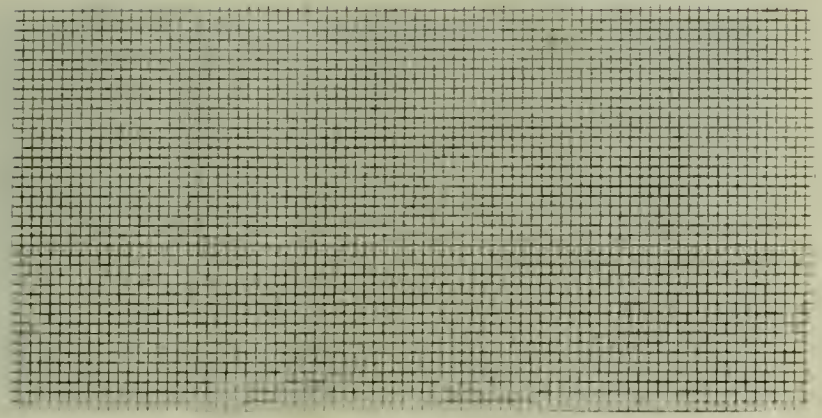
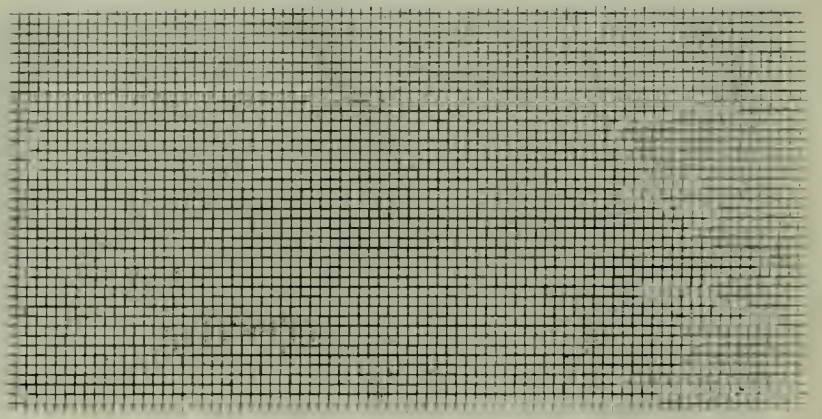
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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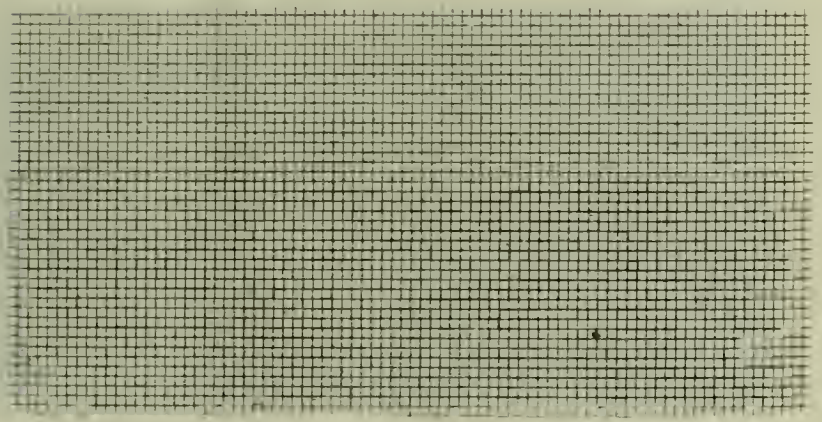
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

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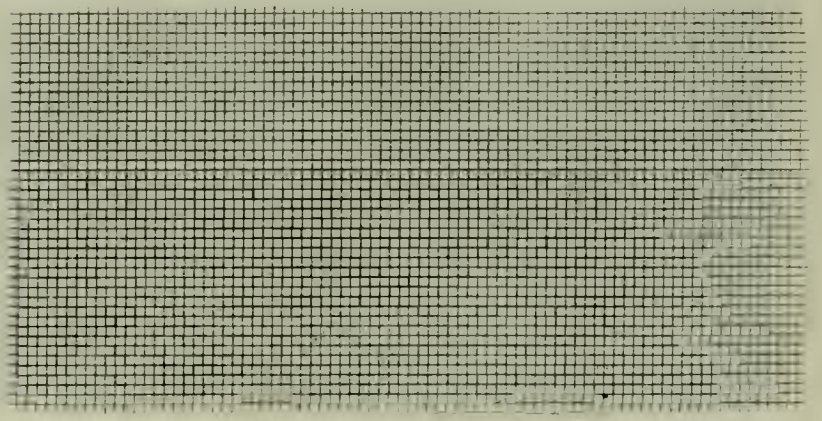
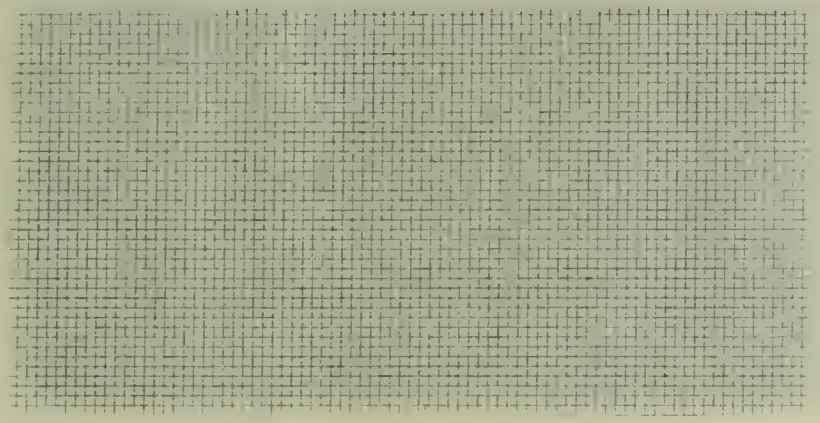


DESIGN Nº

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



DESIGN Nº

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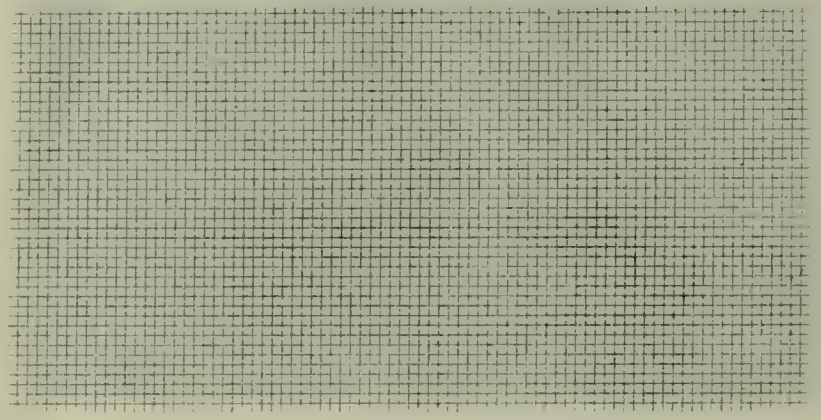
BLACK, WEFT. WHITE, WARP.



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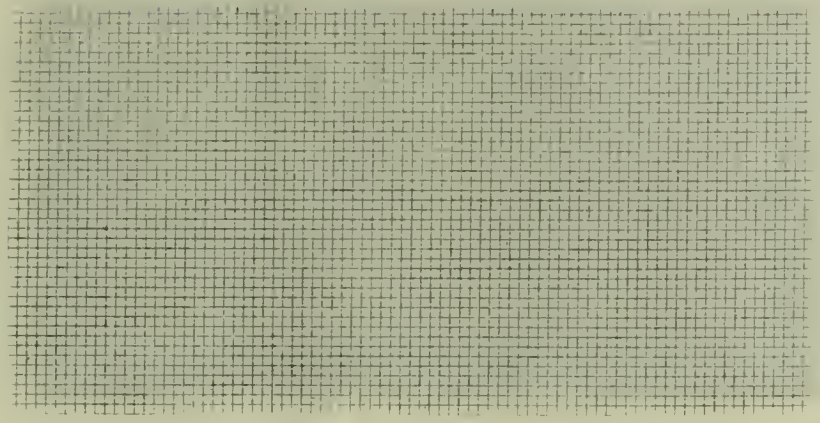
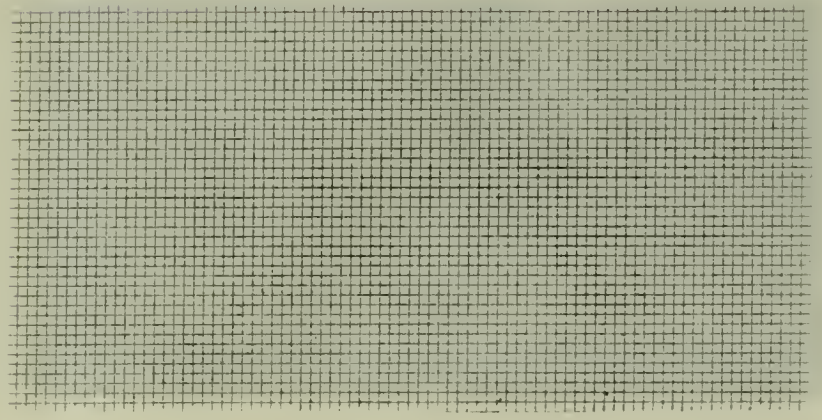


DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN #4

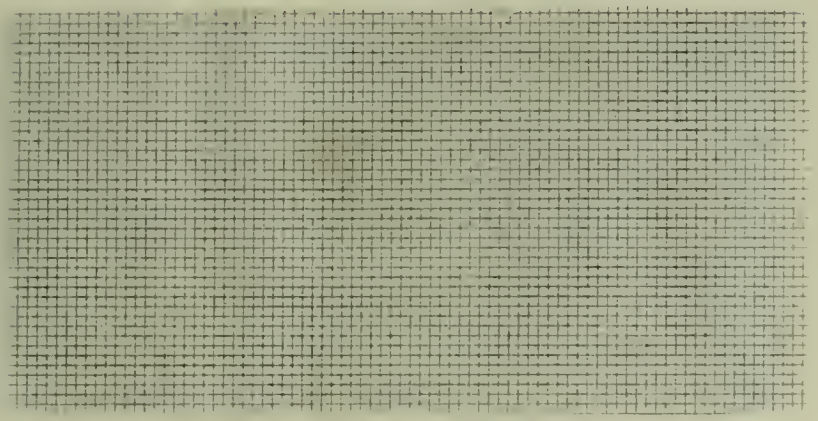
PICKS TO THE ROUND

BLACK: WEFT WHITE: WARP

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN Nº

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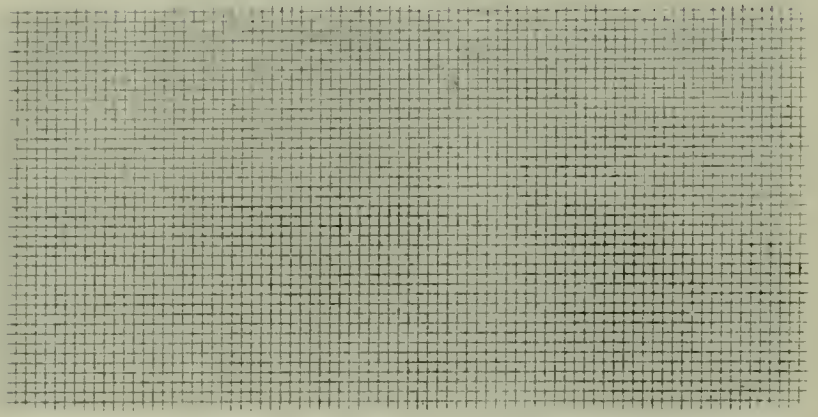

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

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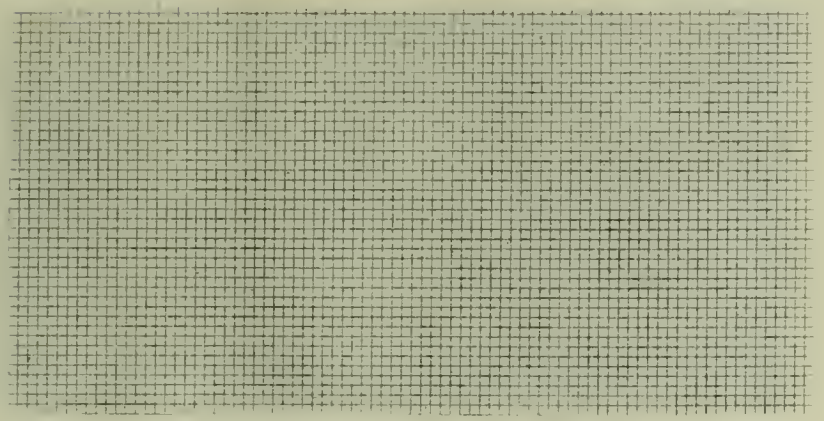

DESIGN Nº

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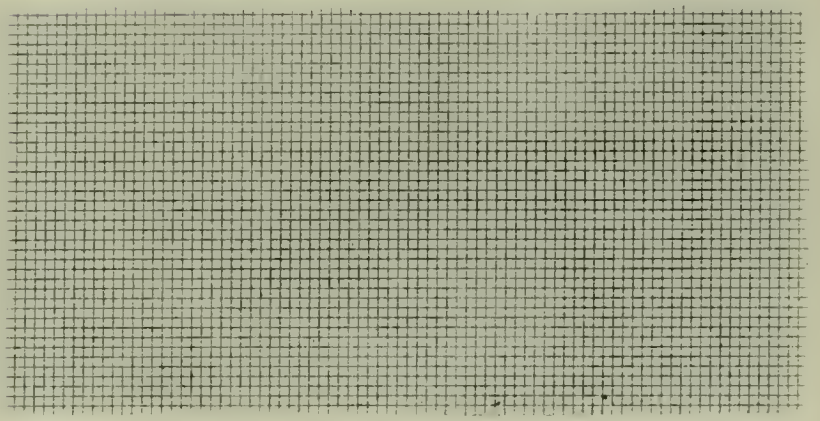
BLACK, WEFT. WHITE, WARP.



SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.

DESIGN Nº

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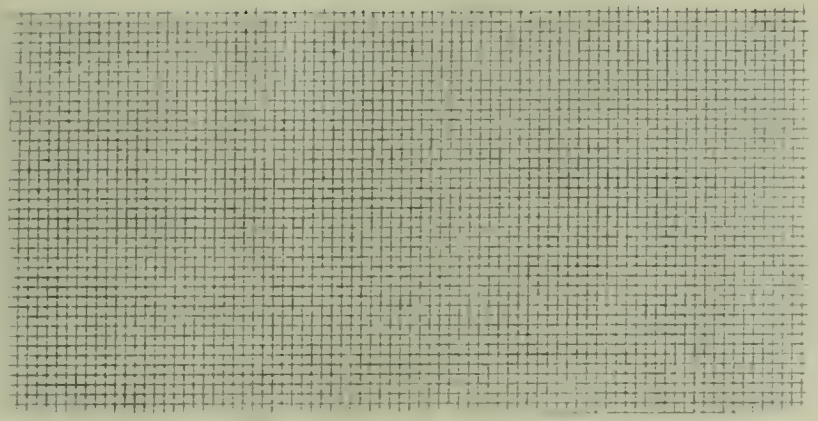

DESIGN Nº

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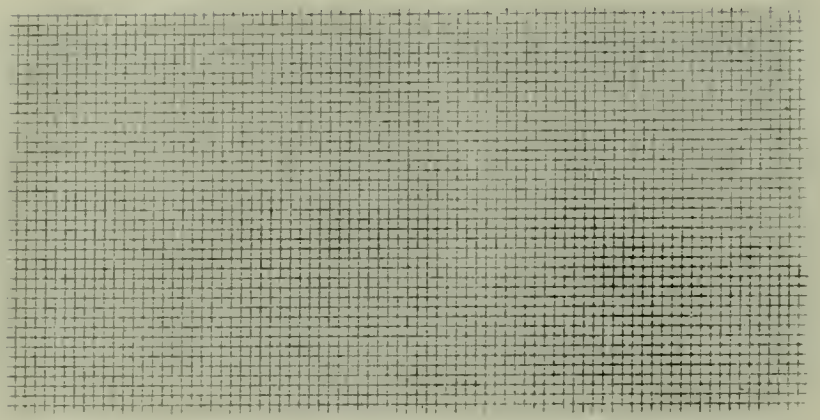

DESIGN Nº

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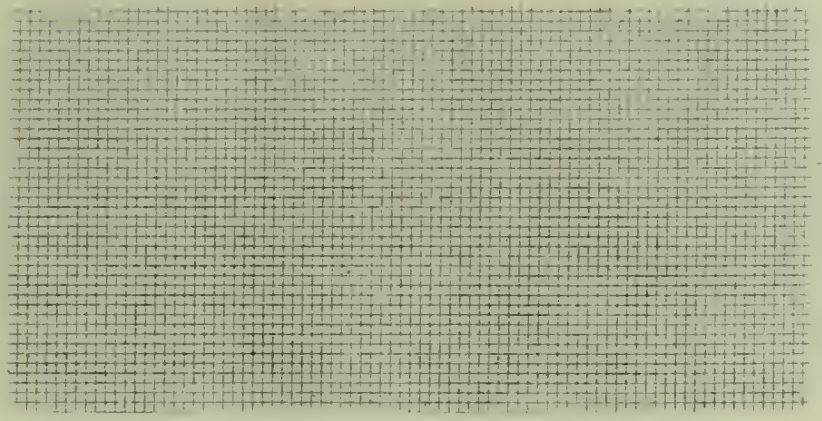
BLACK, WEFT. WHITE, WARP.



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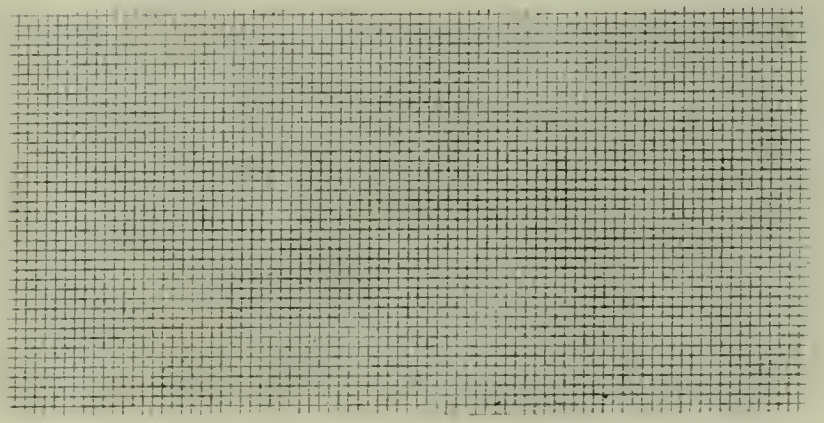

DESIGN Nº

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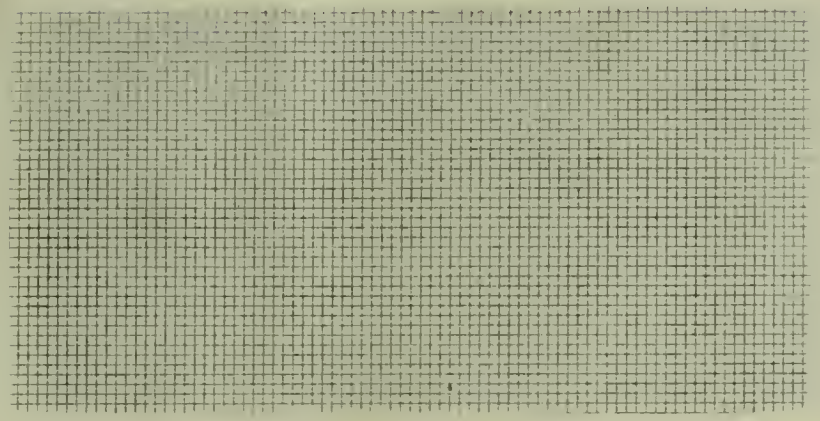
BLACK. WEFT. WHITE, WARP.



DESIGN Nº

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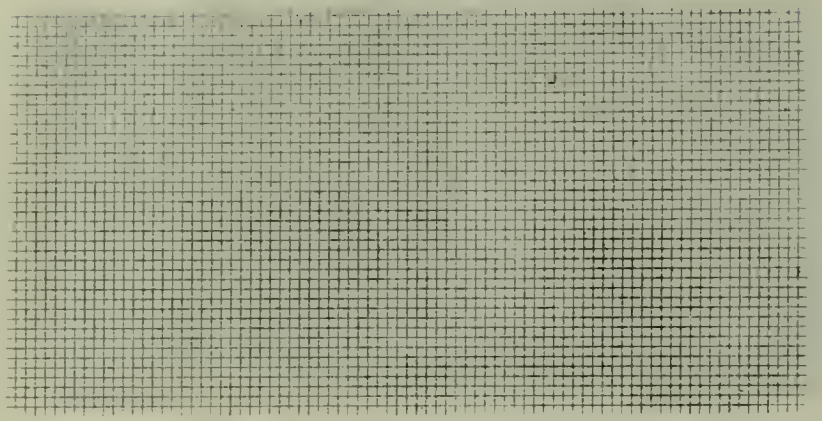
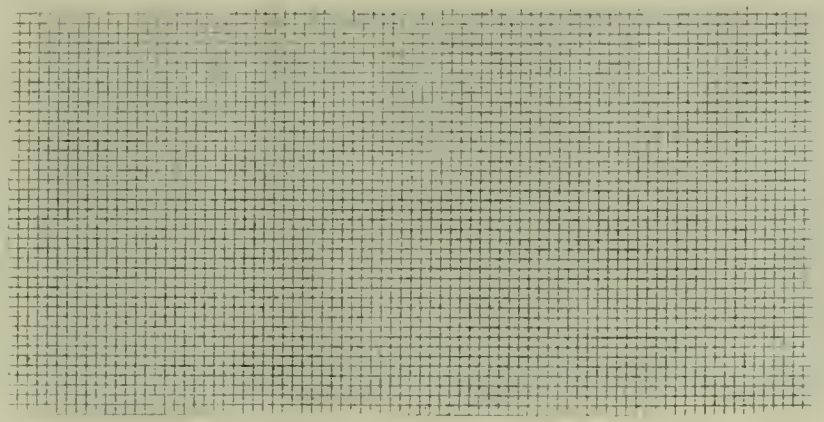
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK. WEFT. WHITE. WARP.



DESIGN Nº

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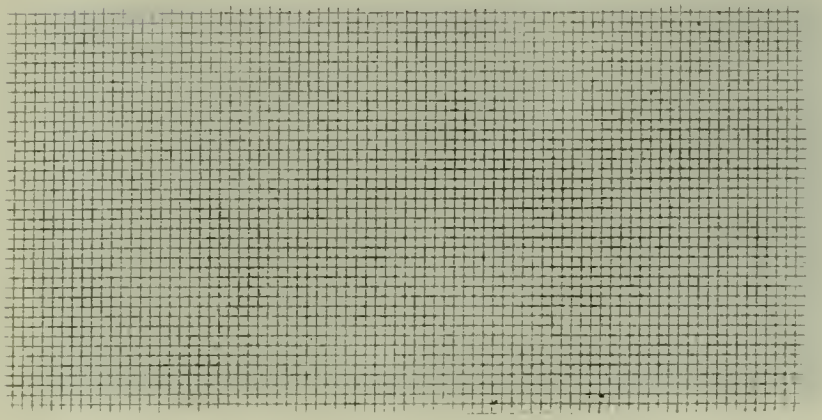
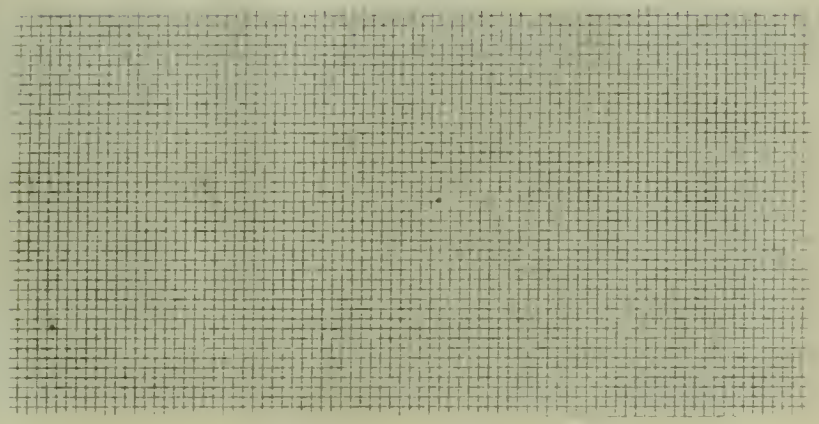


DESIGN Nº

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



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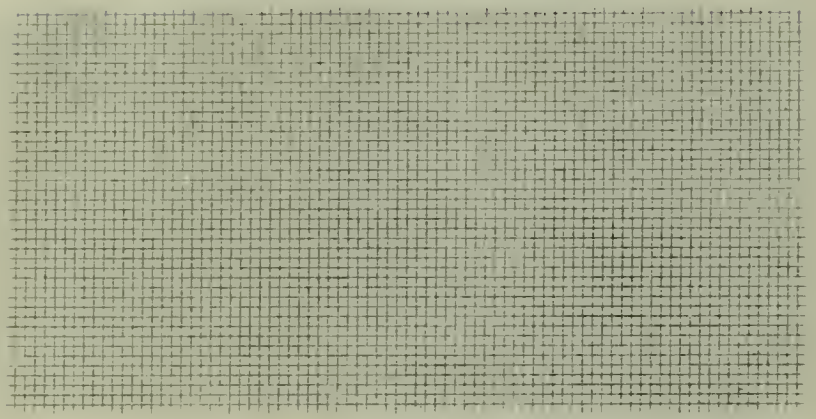
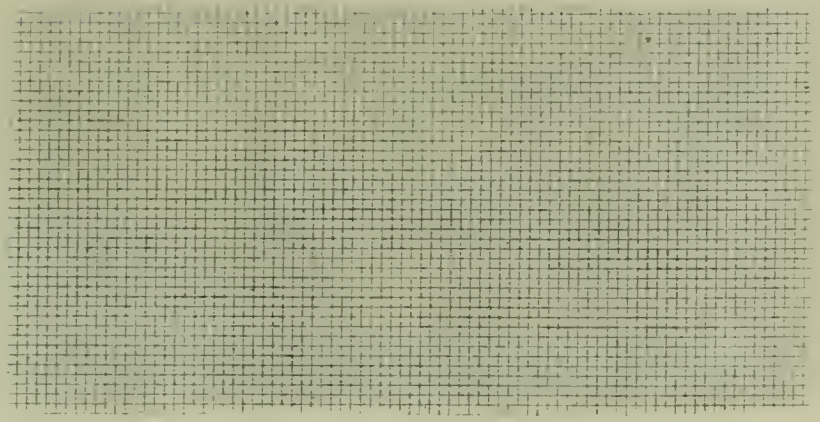
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

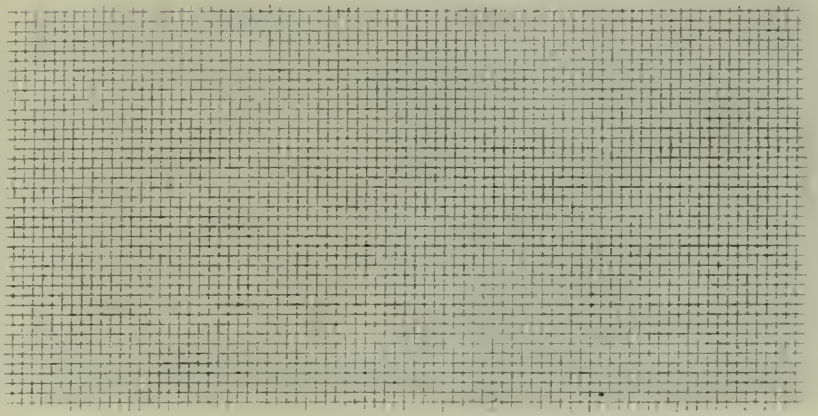
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

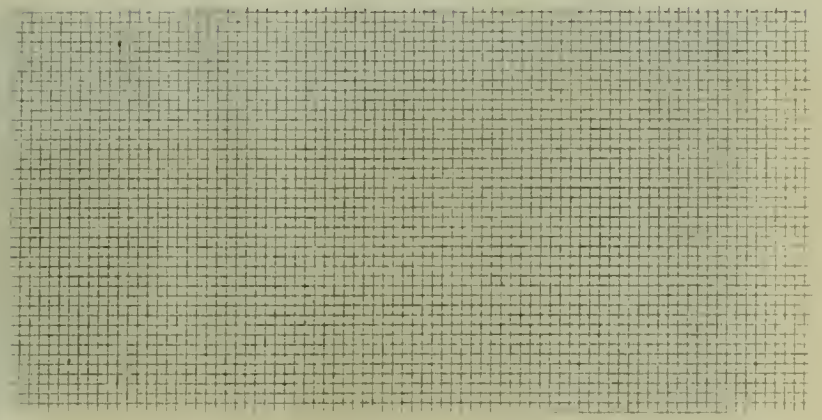
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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SHAFTS PICKS TO THE ROUND.

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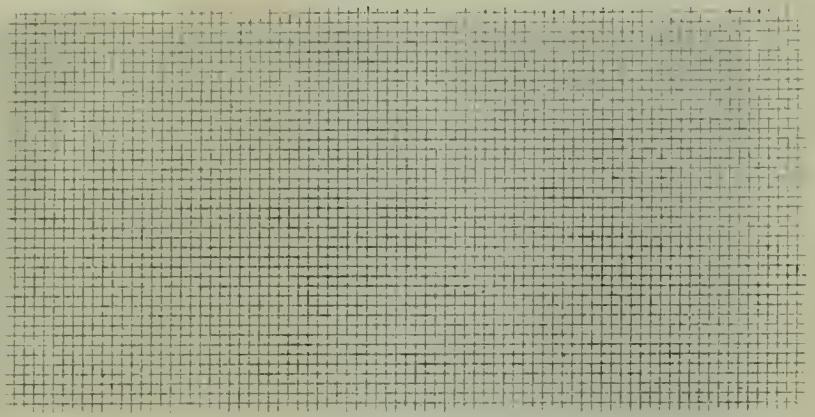
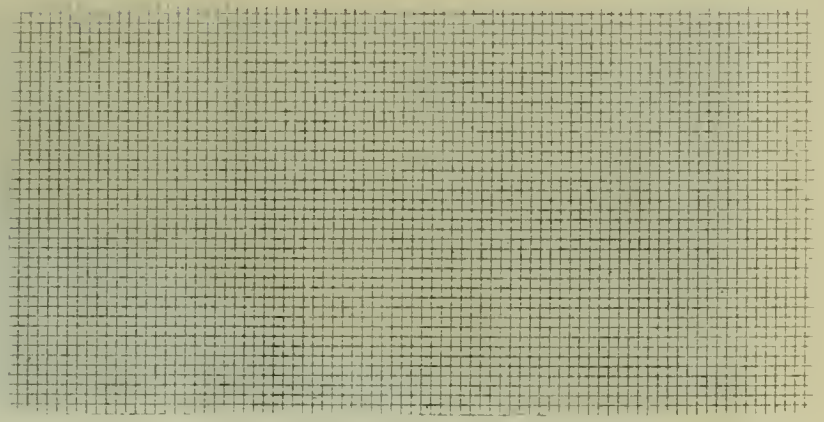


DESIGN Nº

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



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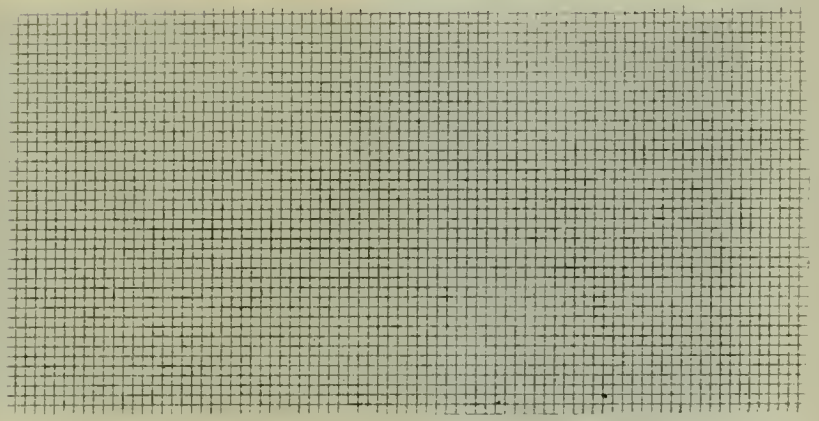

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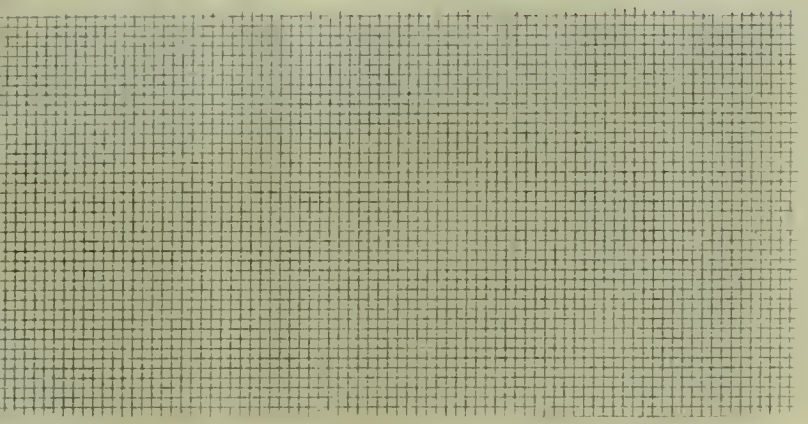

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

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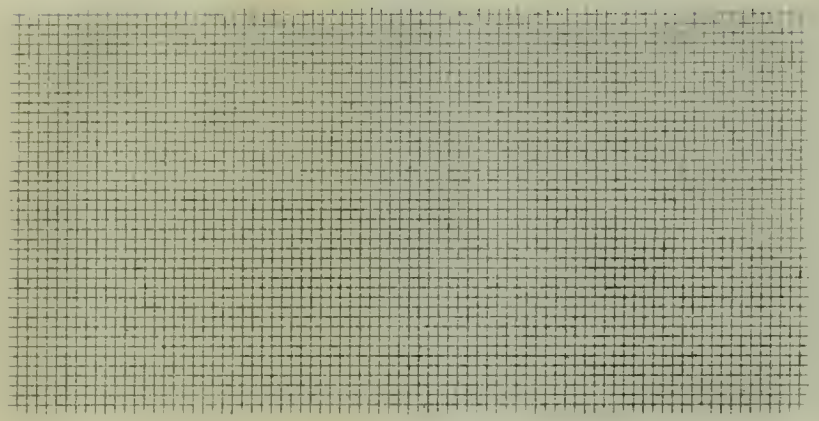
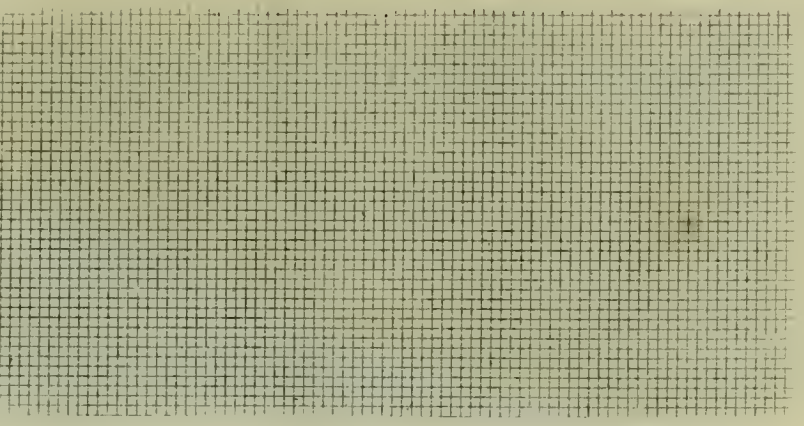


DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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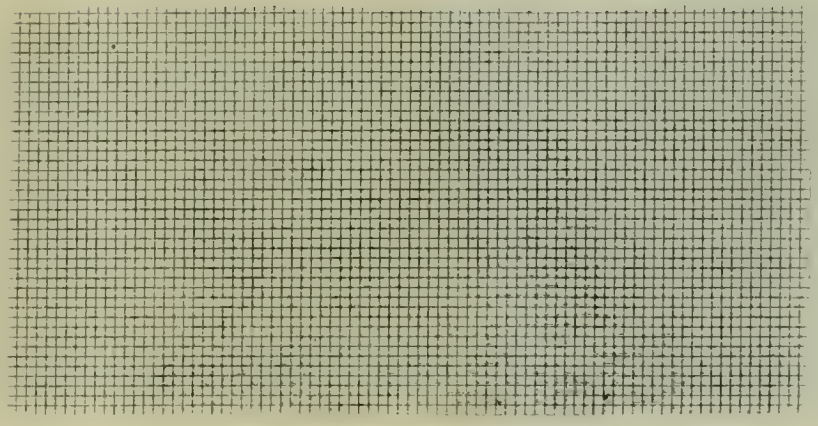
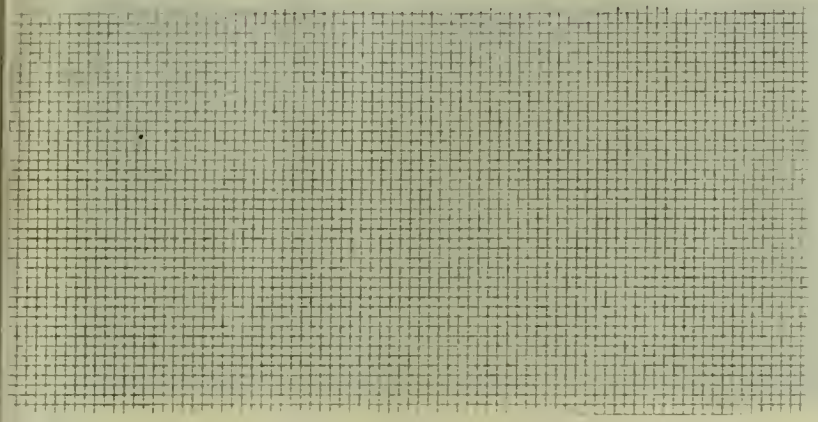
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

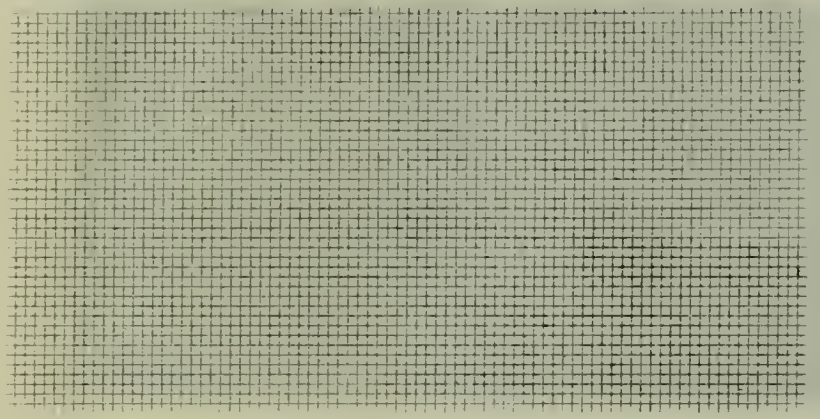
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

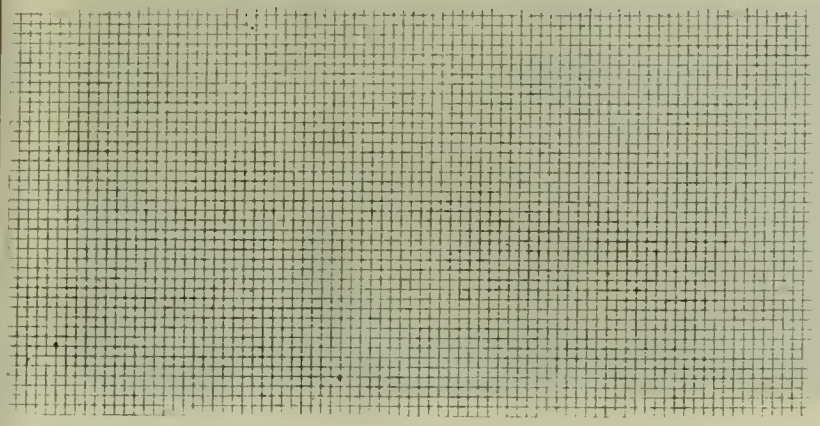
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

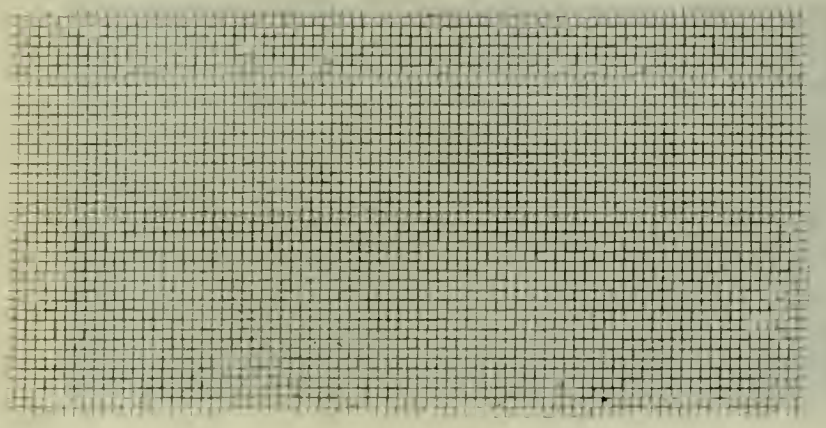
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN Nº

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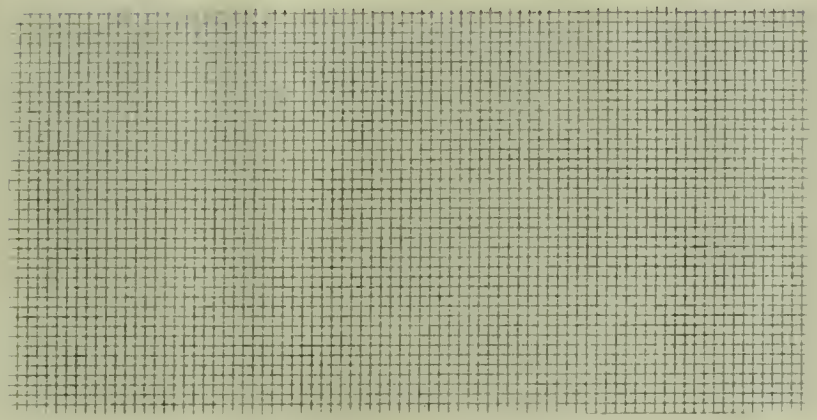
BLACK, WEFT. WHITE, WARP.



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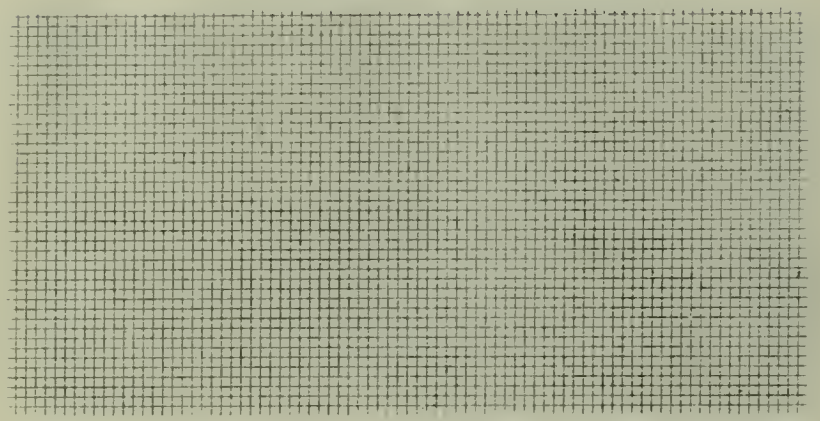
BLACK, WEFT. WHITE, WARP.



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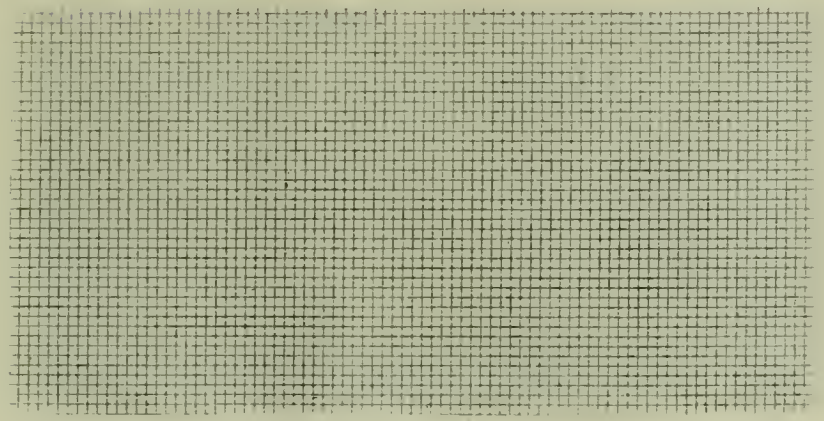
BLACK, WEFT. WHITE, WARP.



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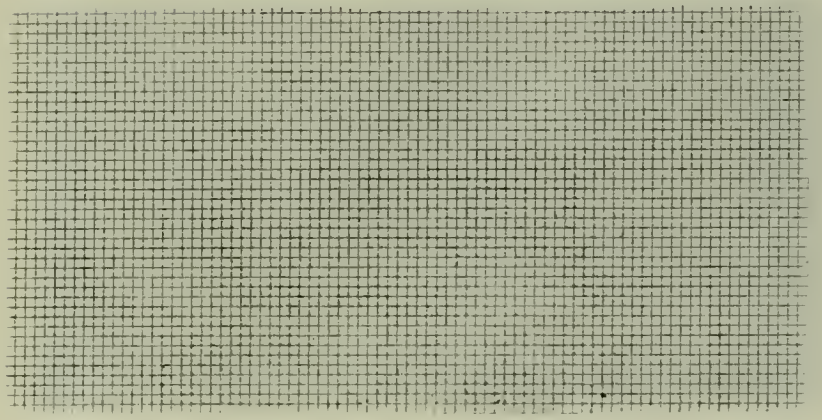
BLACK, WEFT. WHITE, WARP.



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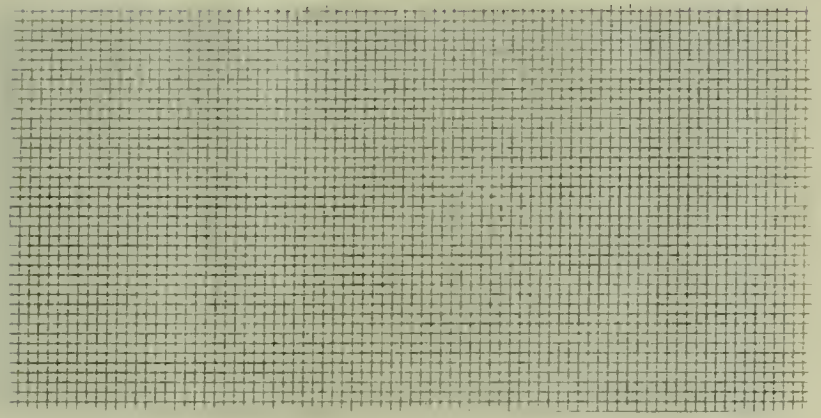
BLACK, WEFT. WHITE, WARP.



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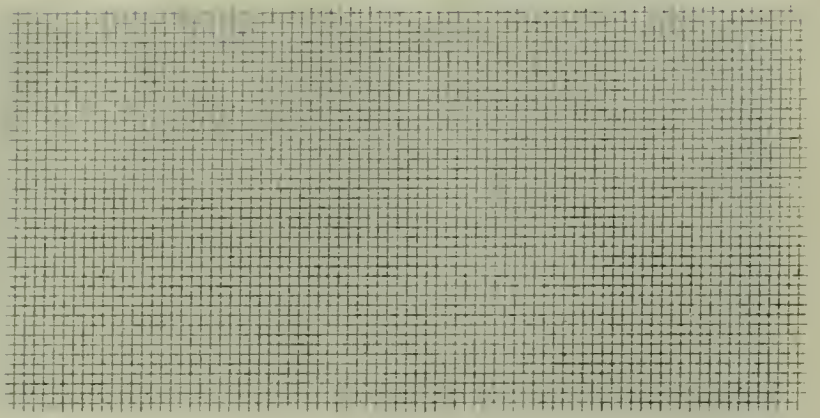
BLACK, WEFT. WHITE, WARP.



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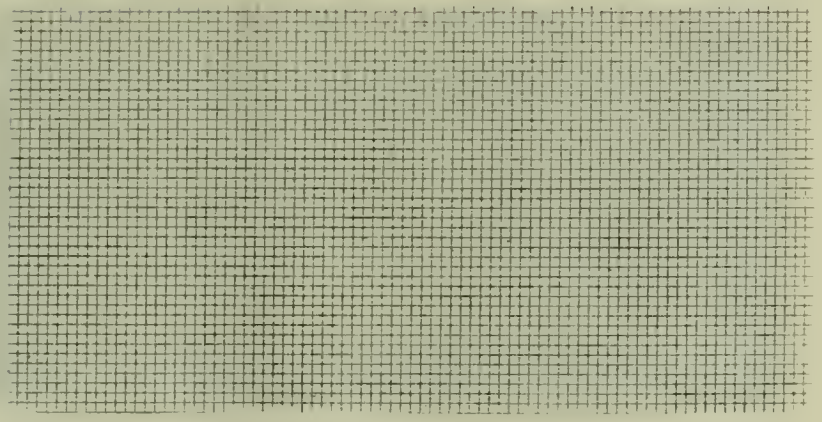
BLACK, WEFT. WHITE, WARP.



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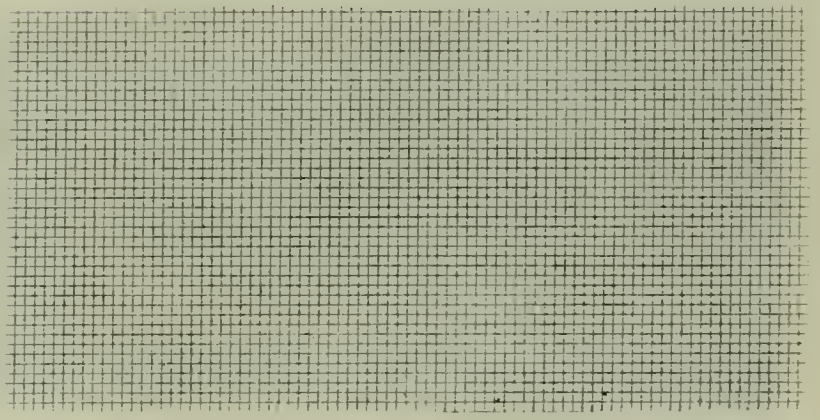
BLACK, WEFT. WHITE, WARP.



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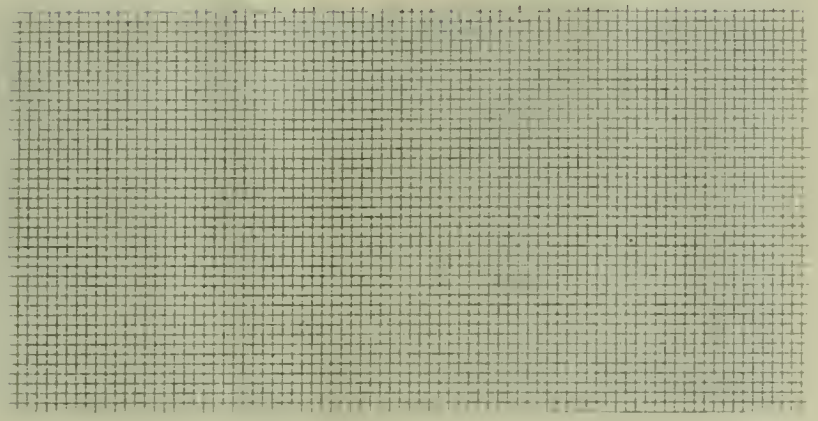

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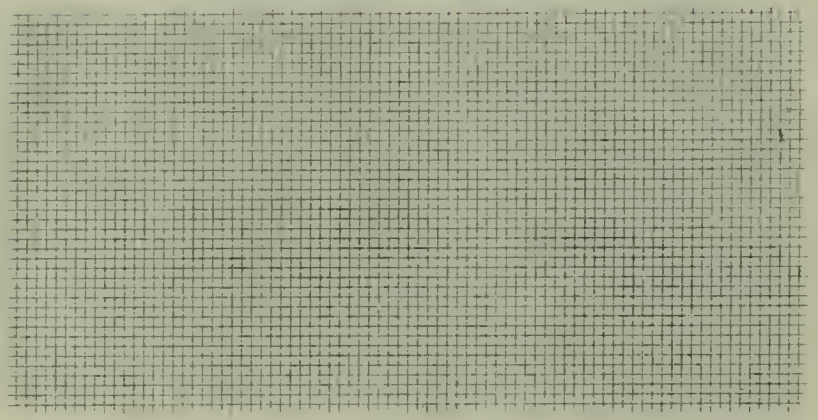

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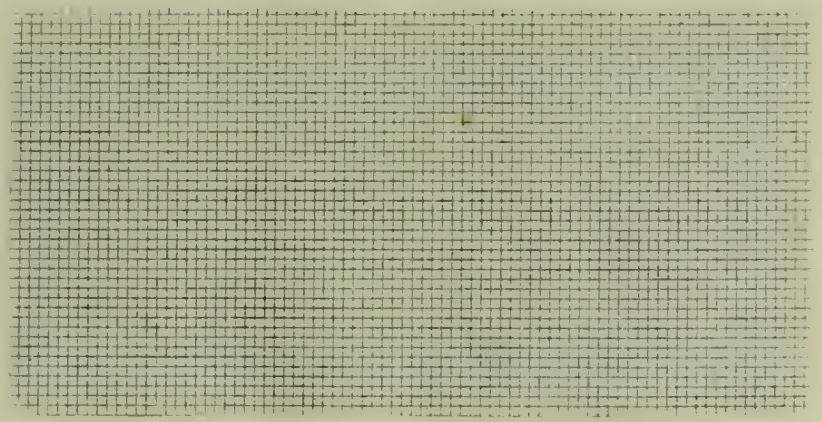
BLACK, WEFT. WHITE, WARP.



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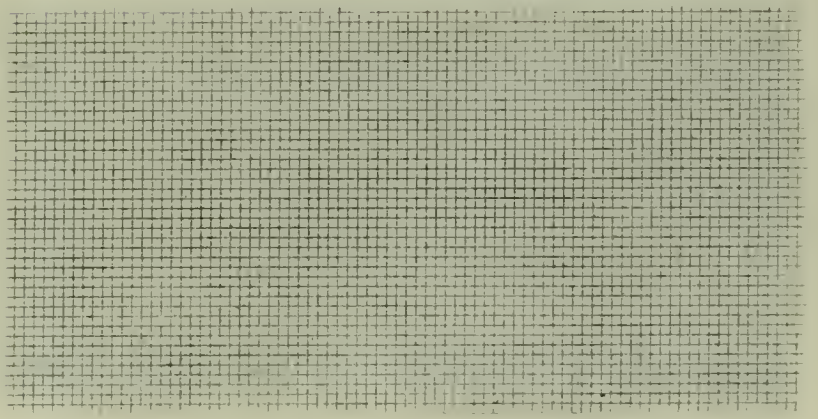

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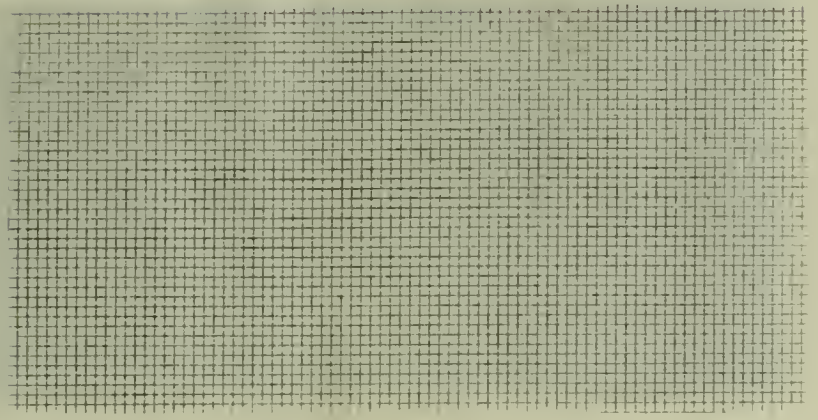
SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



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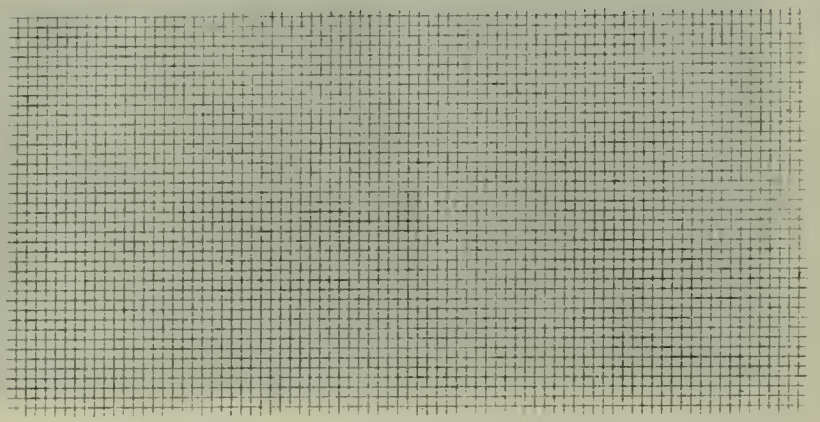
BLACK, WEFT. WHITE, WARP.



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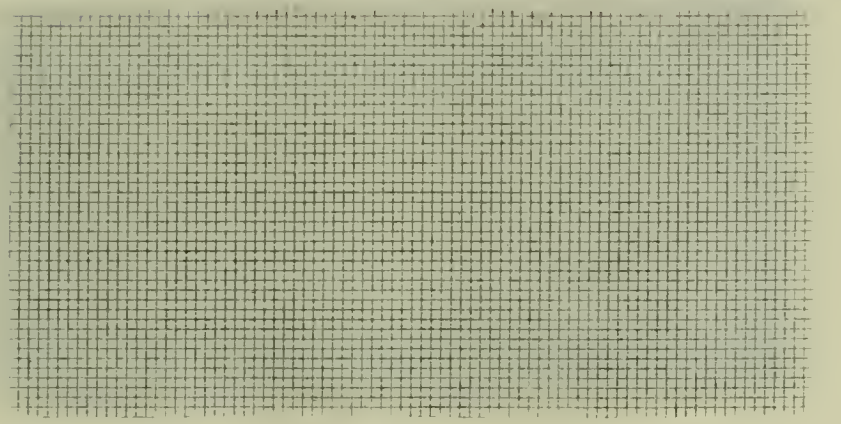
BLACK, WEFT. WHITE, WARP.



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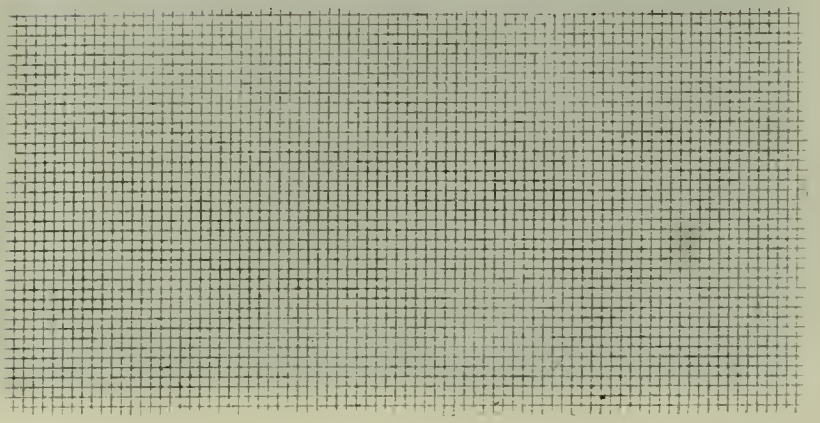
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

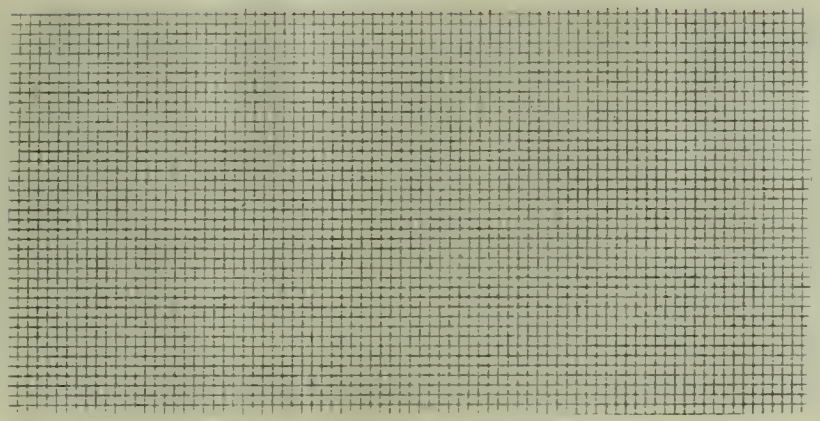
SHAFTS sticks to the ground

BLACK WEFT WHITE WARP

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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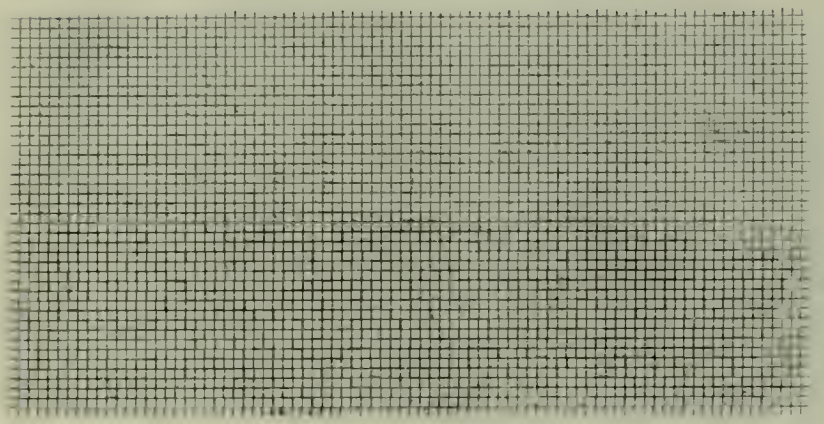

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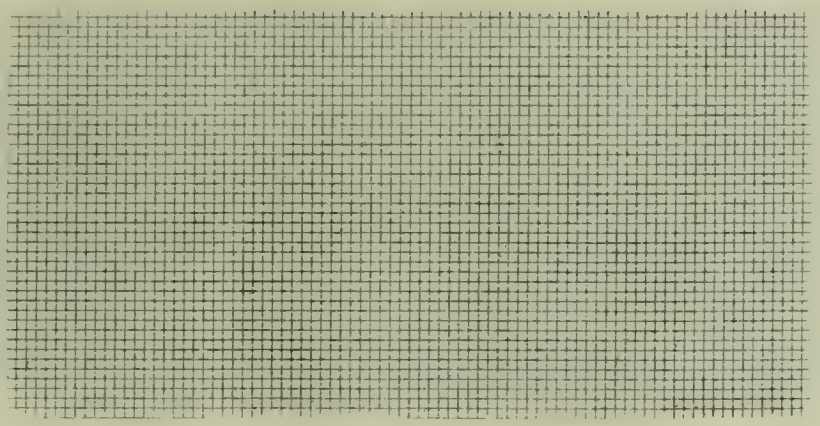
BLACK, WEFT. WHITE, WARP.



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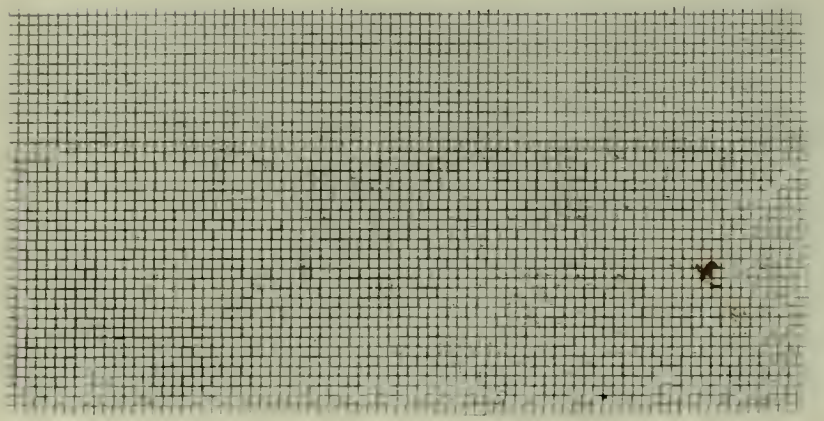
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No

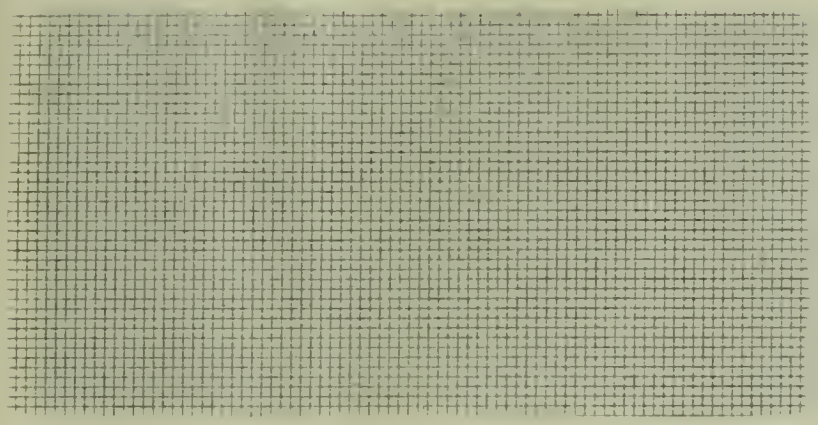
HEARTS PICKS TO THE ROUND

BLACK WEFT. WHITE WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



DESIGN Nº

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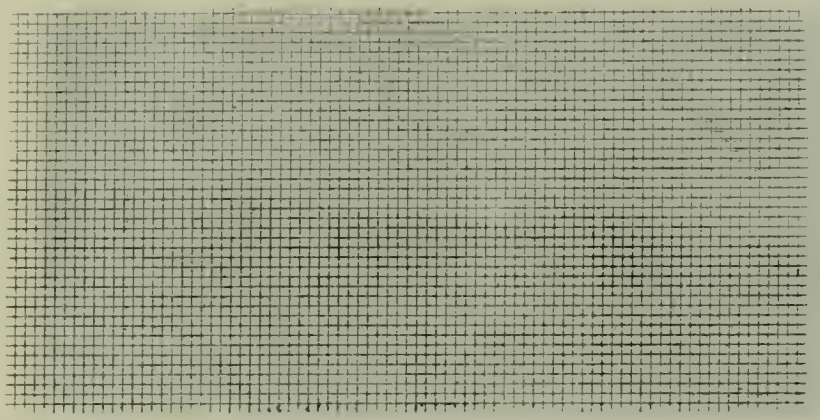

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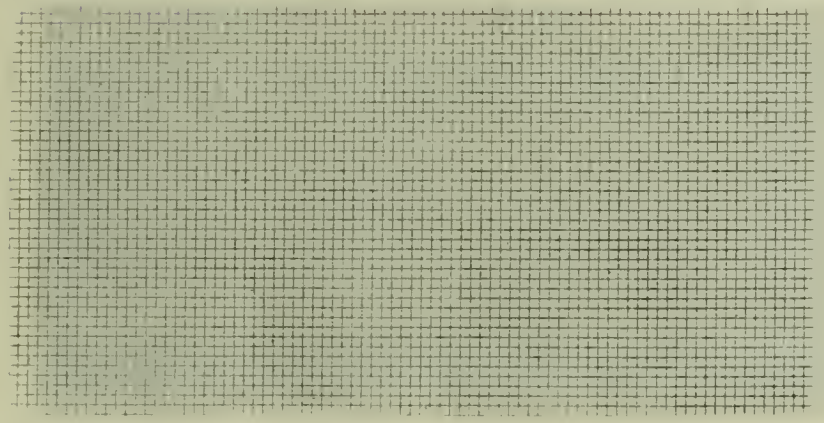

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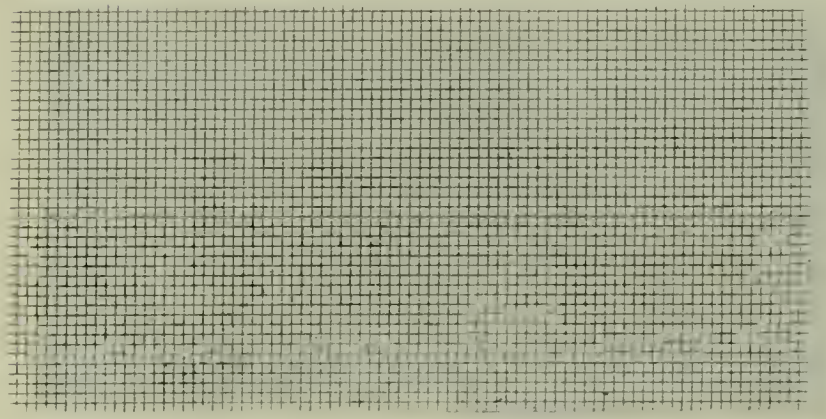

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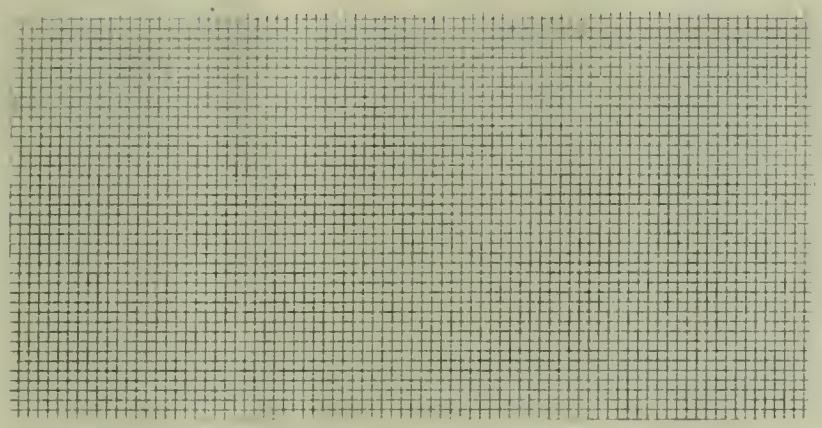
BLACK, WEFT. WHITE, WARP.



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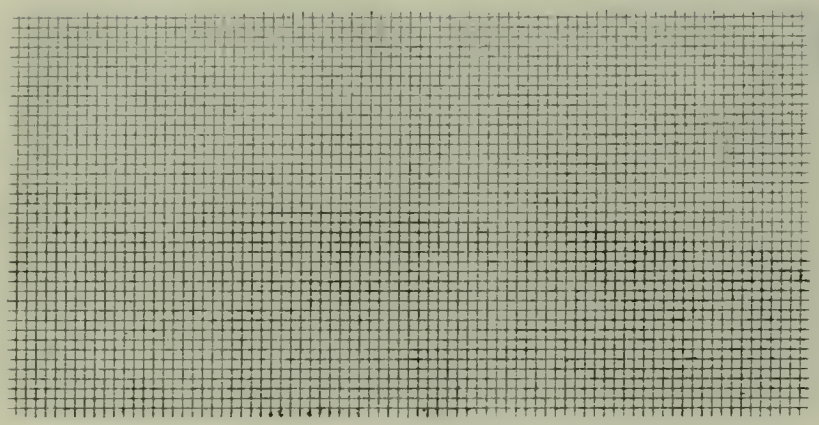

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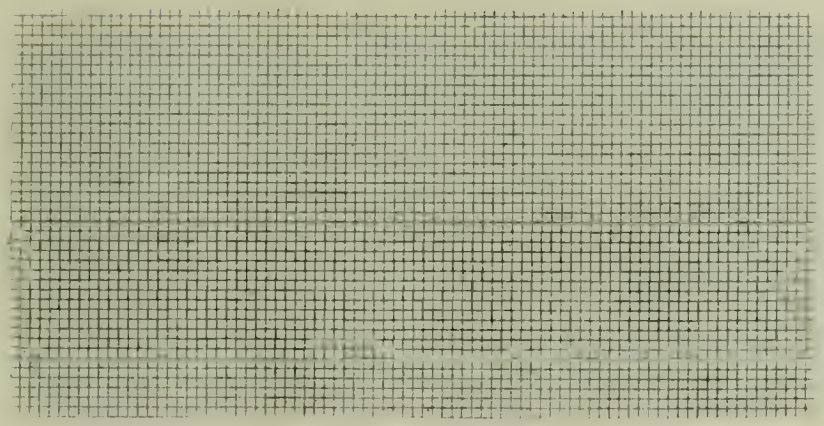

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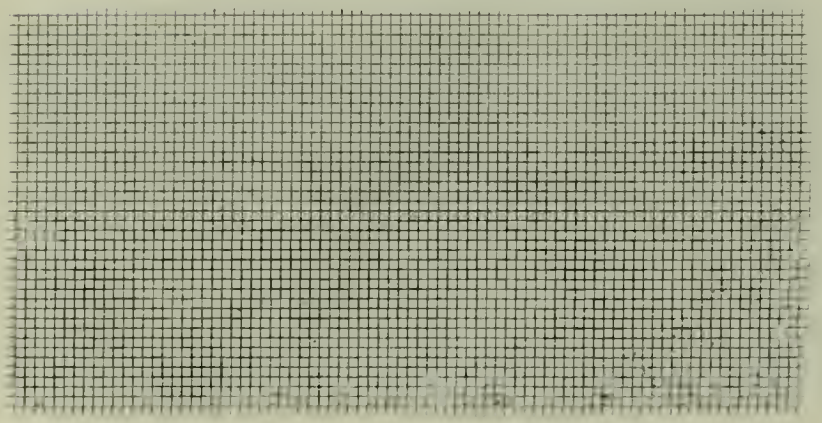

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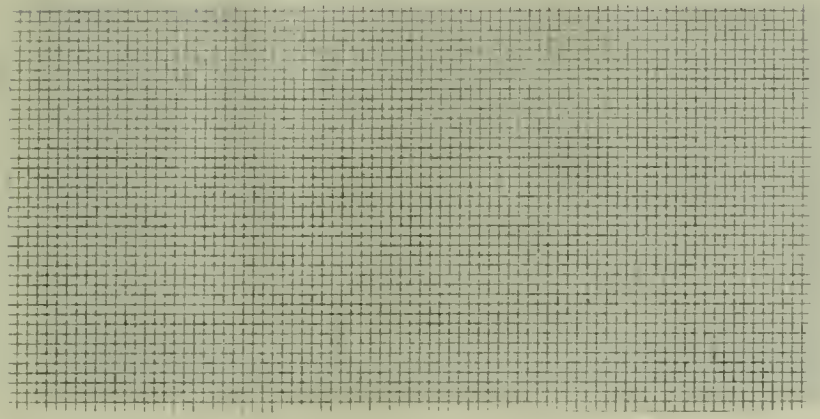
BLACK, WEFT. WHITE, WARP.



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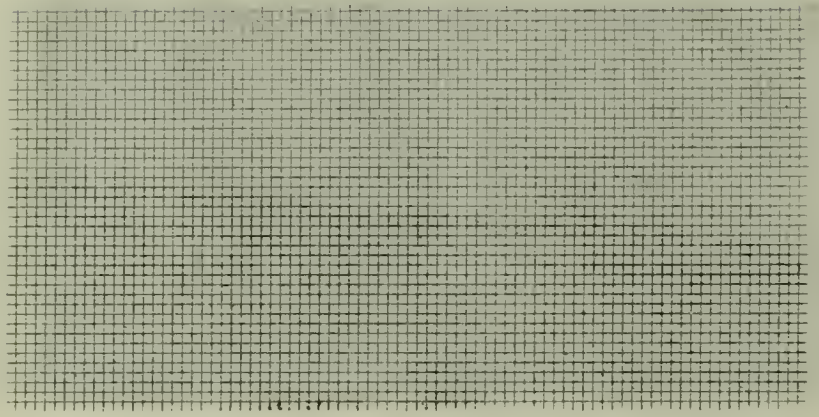

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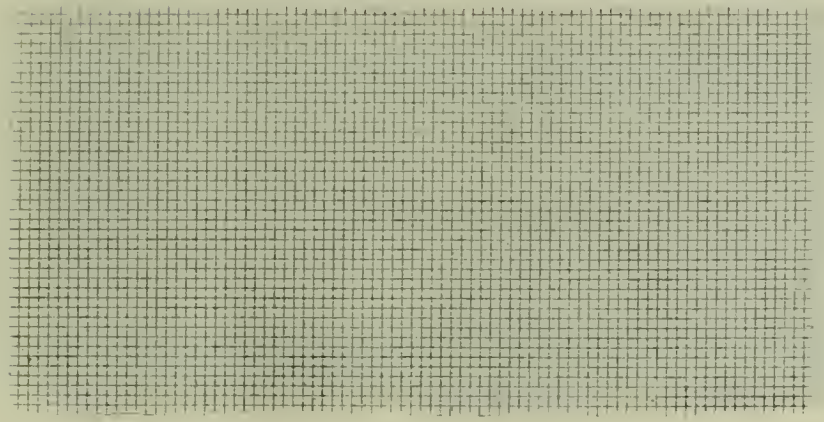

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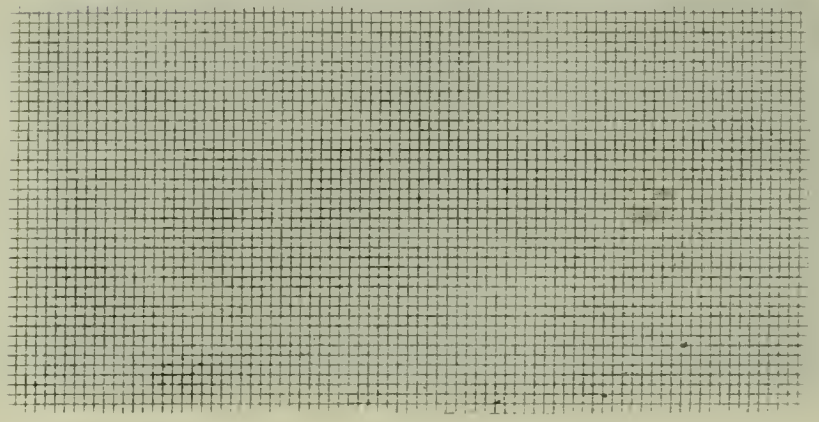

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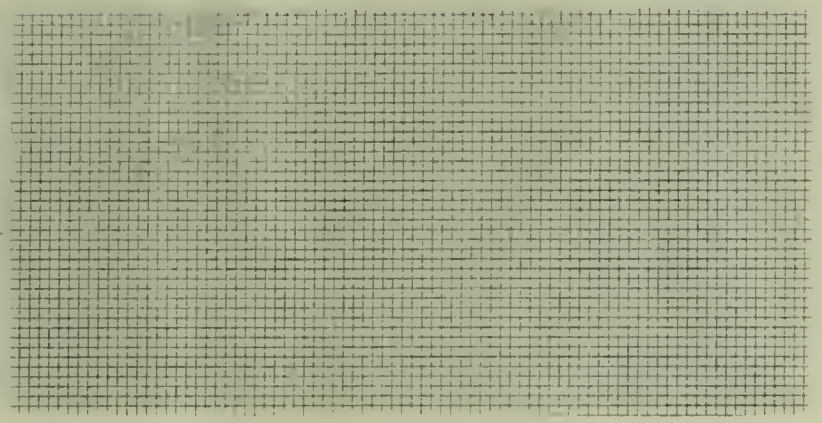

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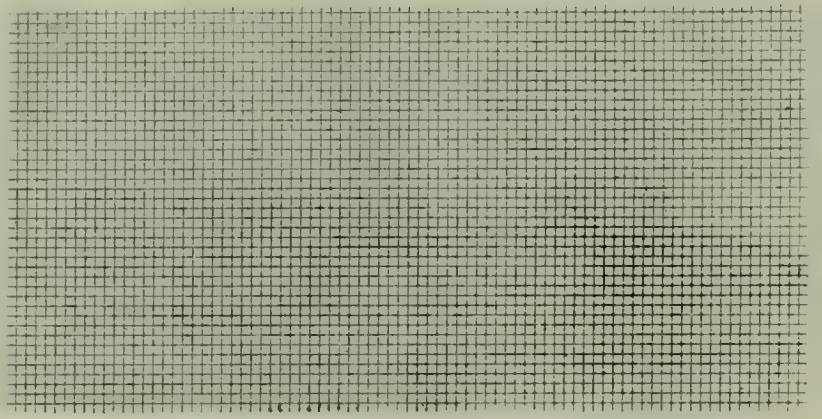

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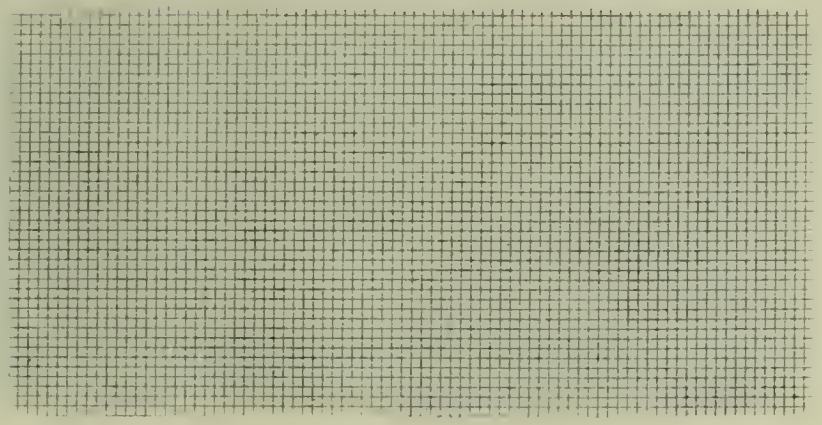

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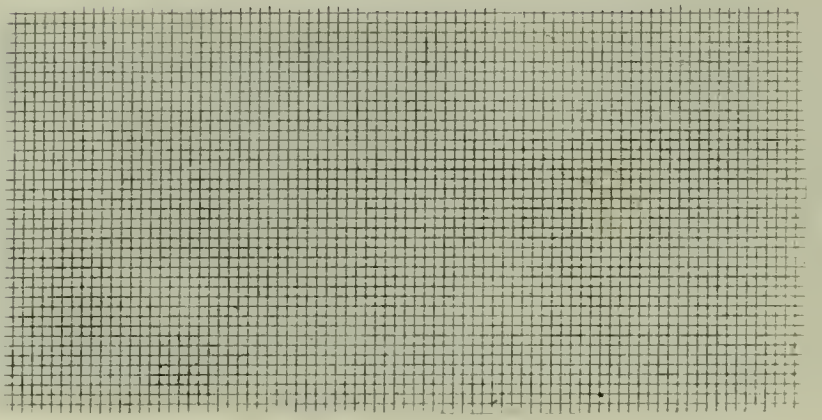

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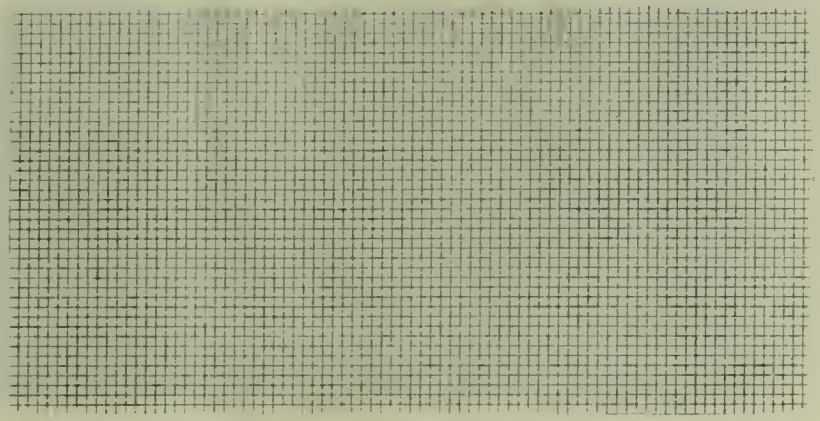

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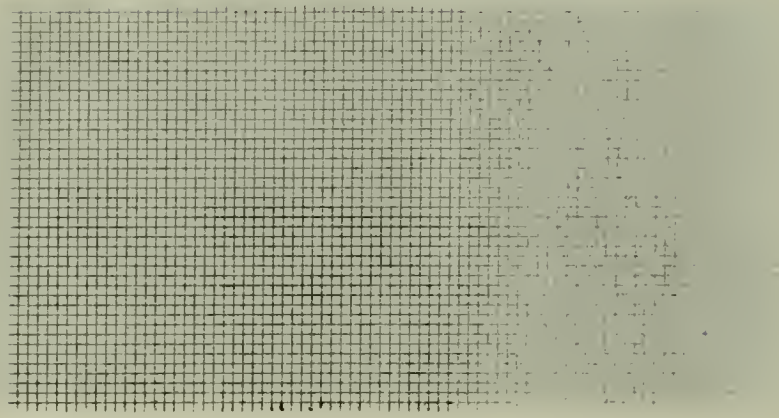

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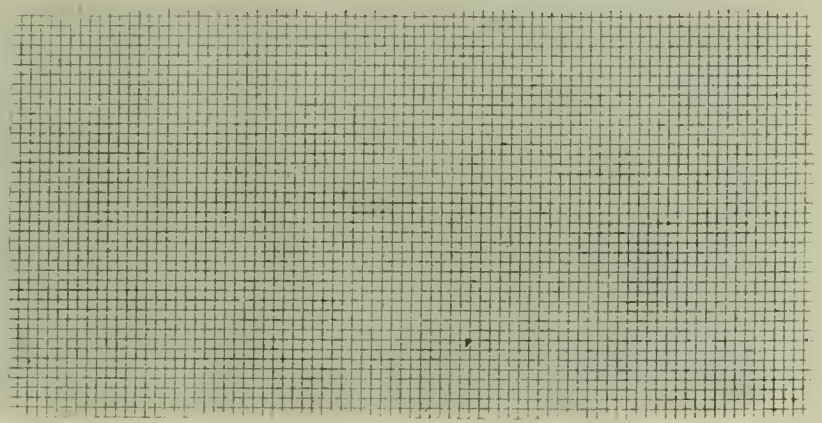

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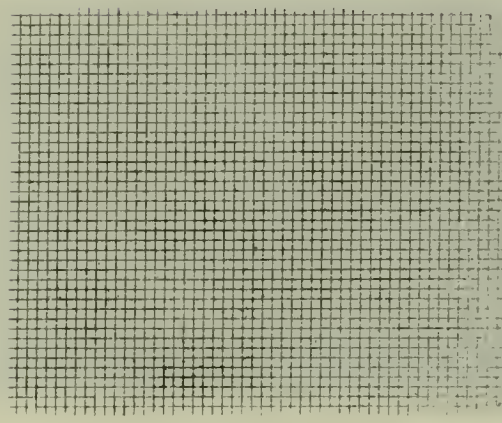

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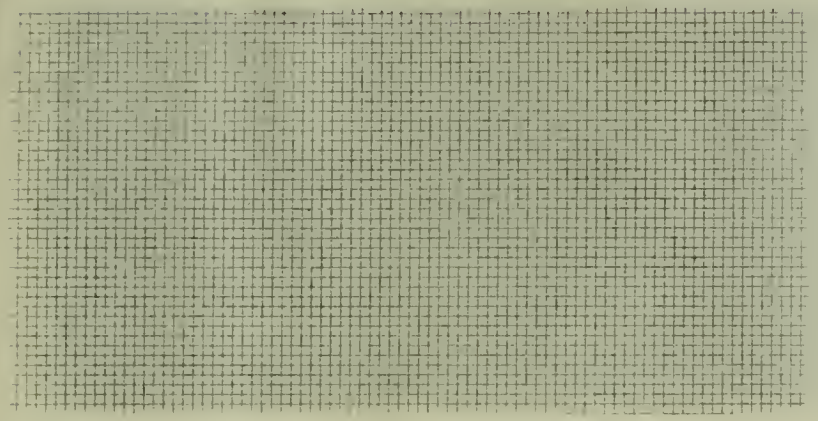

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SHAFTS PICKS TO THE ROUND.

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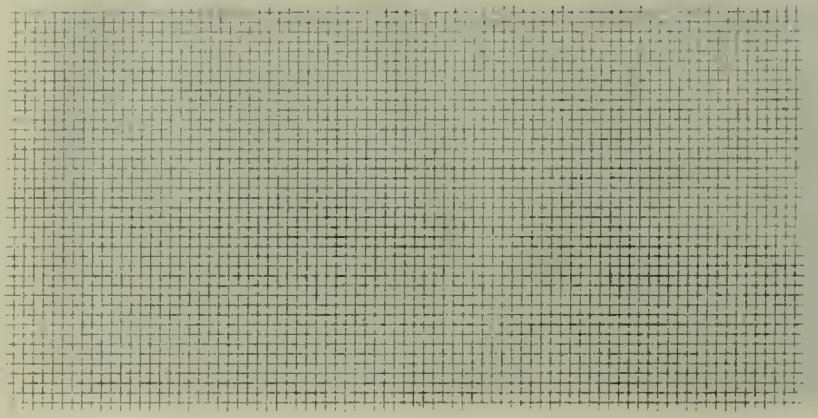
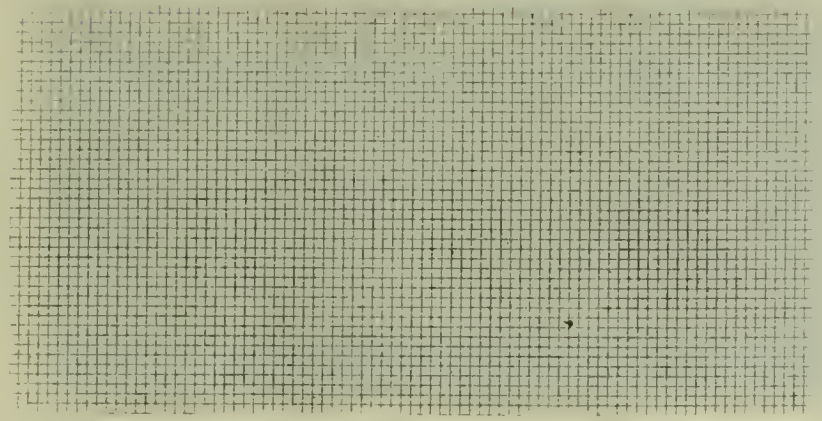


DESIGN Nº

SHAFTS PICKS TO THE ROUND.

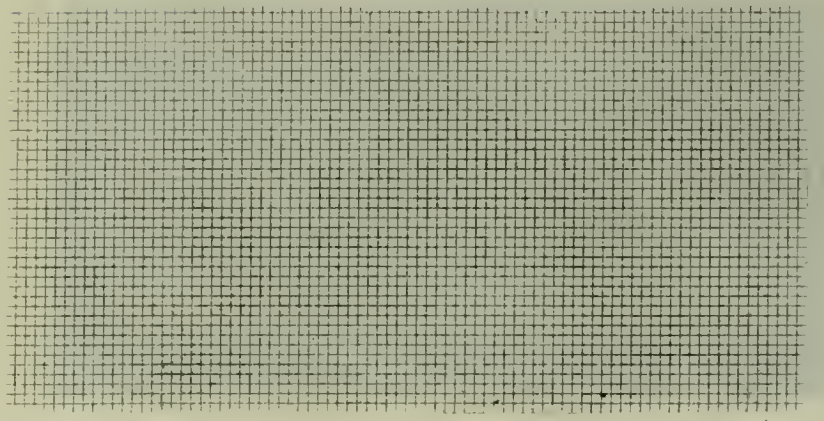
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN Nº

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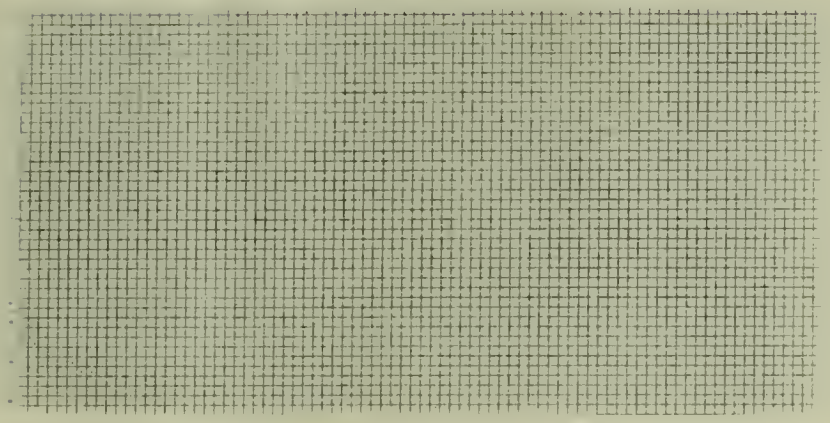
BLACK, WEFT. WHITE, WARP.



DESIGN Nº

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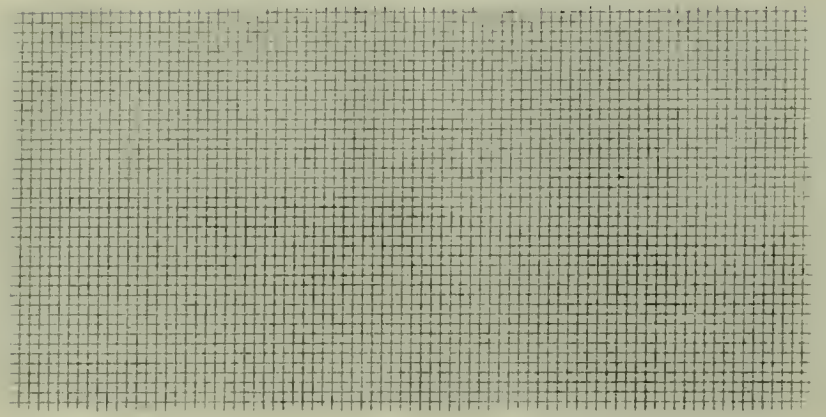
BLACK, WEFT. WHITE, WARP.



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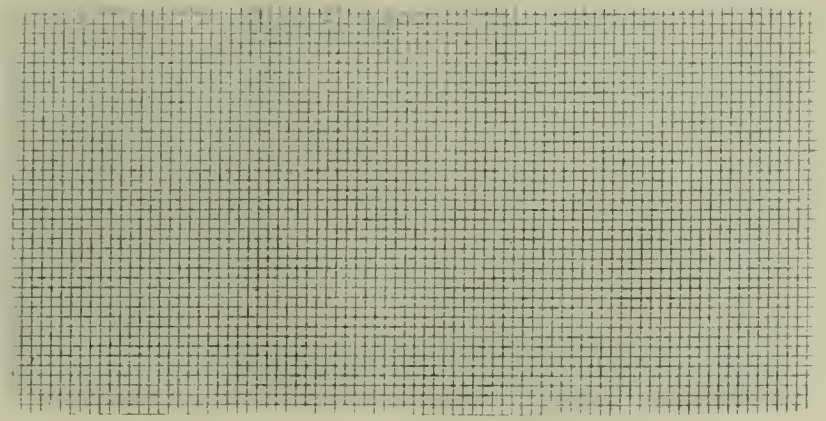

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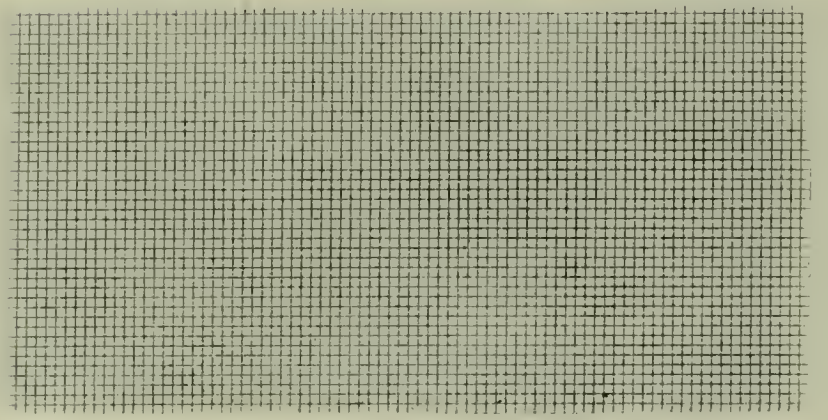

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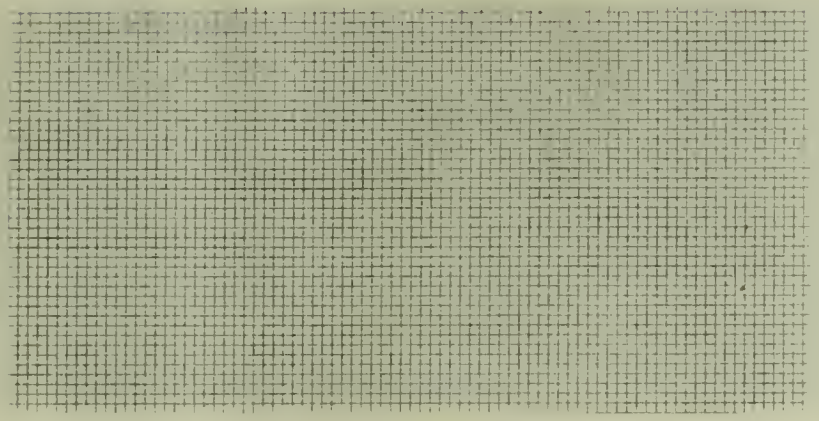

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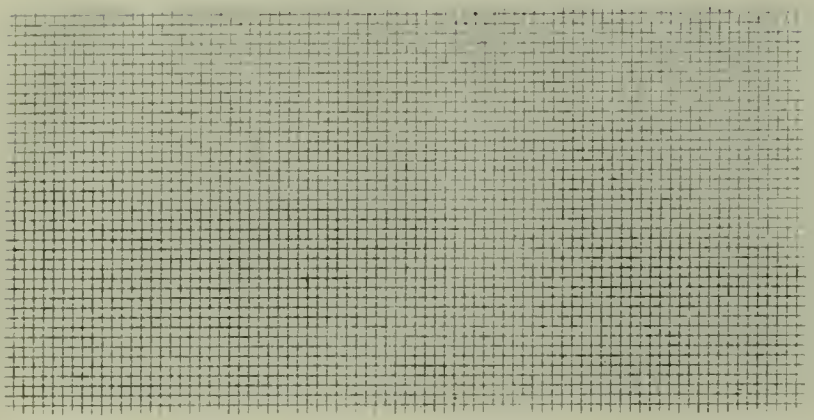
BLACK, WEFT. WHITE, WARP.



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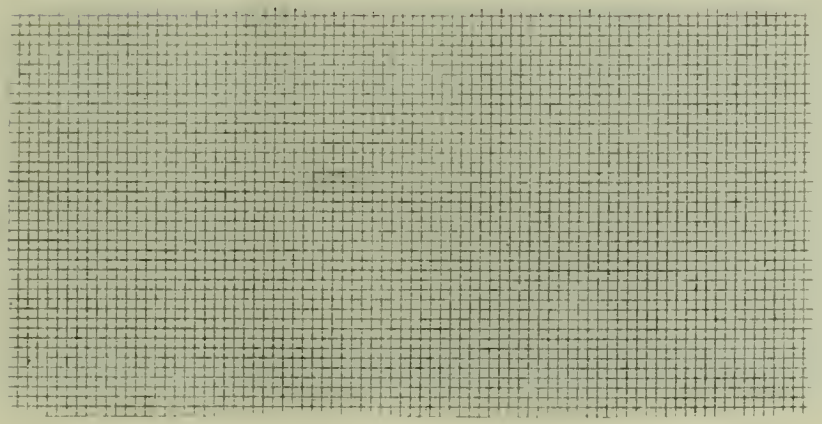

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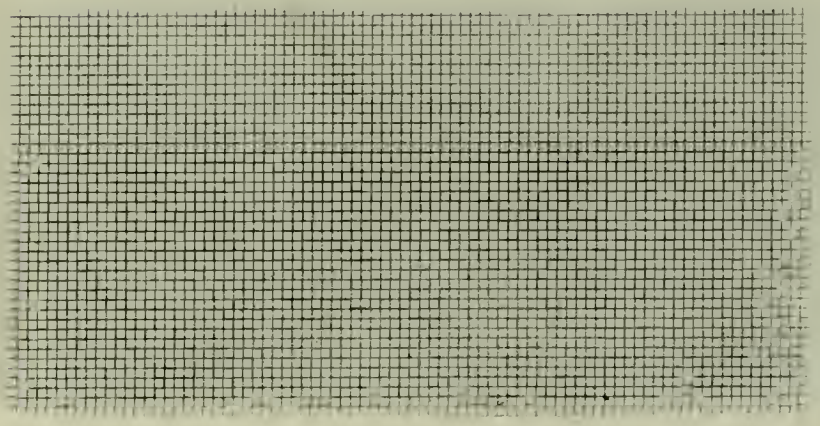

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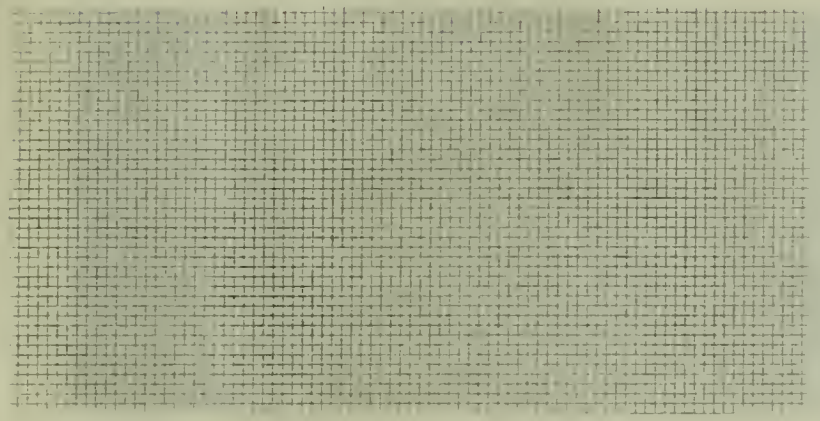
BLACK, WEFT. WHITE, WARP.



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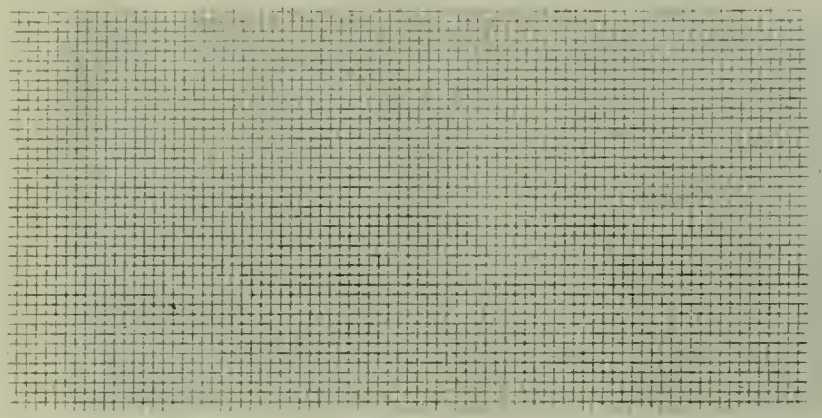

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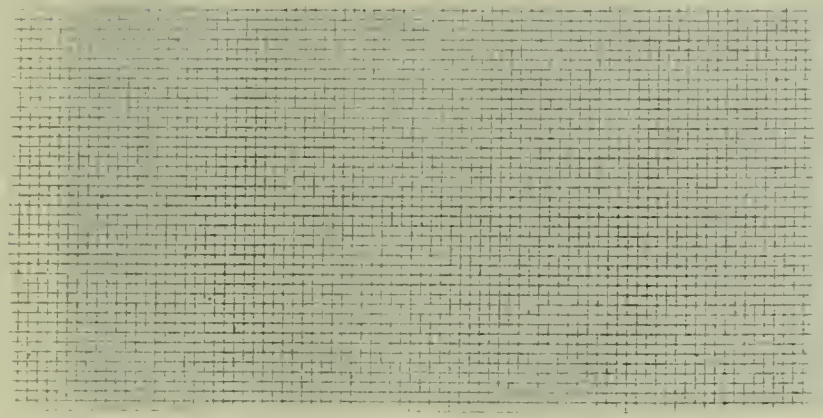
BLACK. WEFT. WHITE. WARP.



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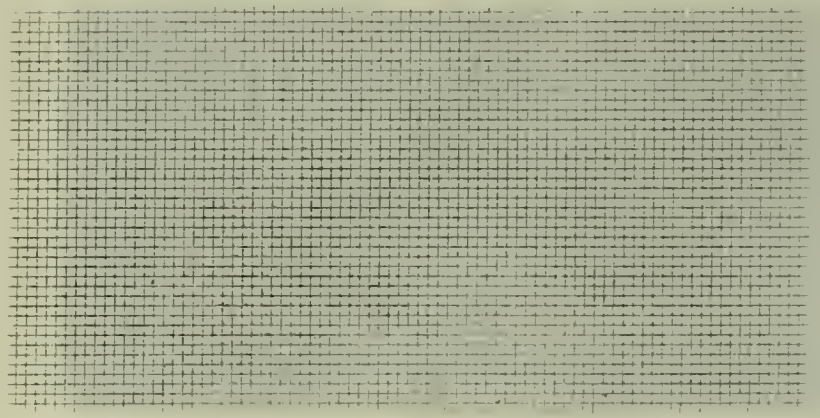
BLACK. WEFT. WHITE. WARP.



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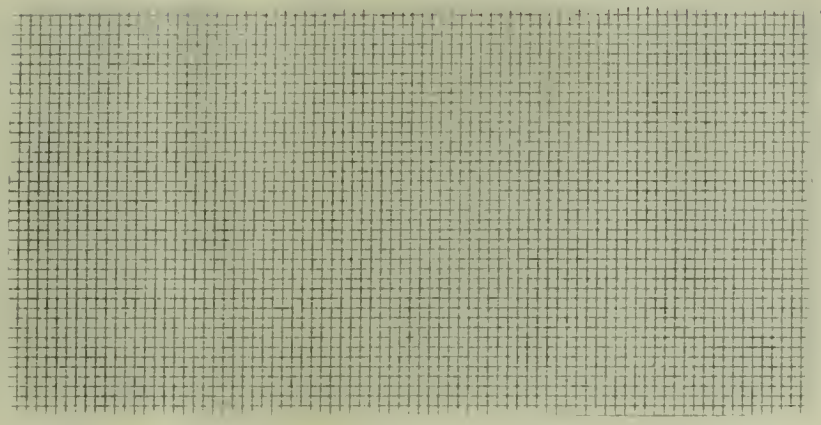

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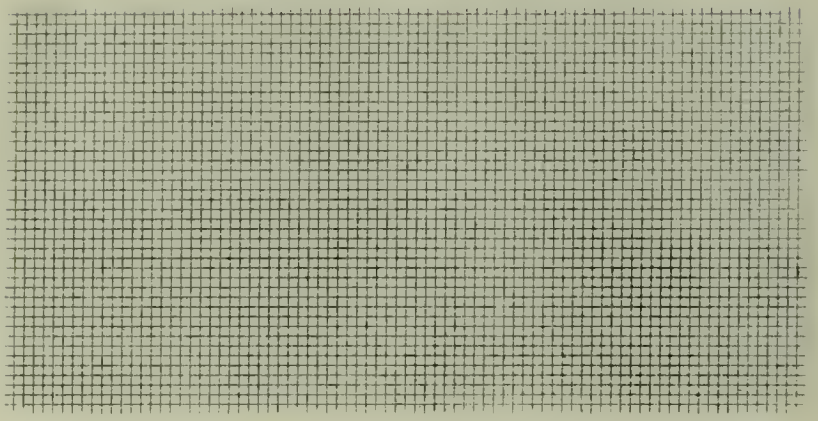
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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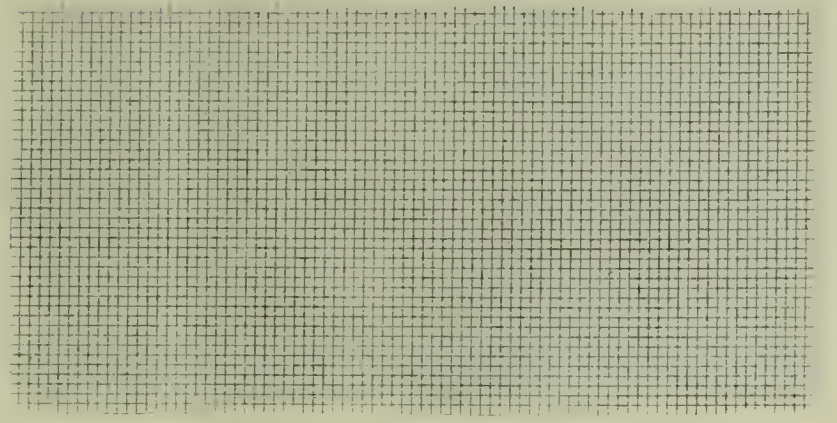
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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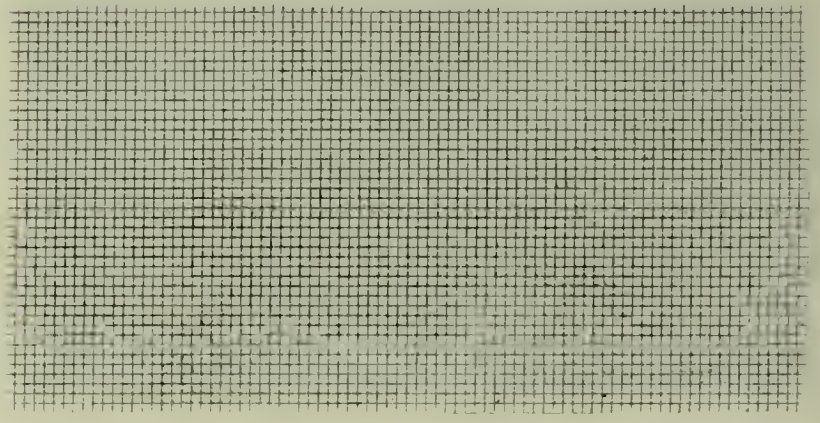

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SHAFTS PICKS TO THE ROUND.

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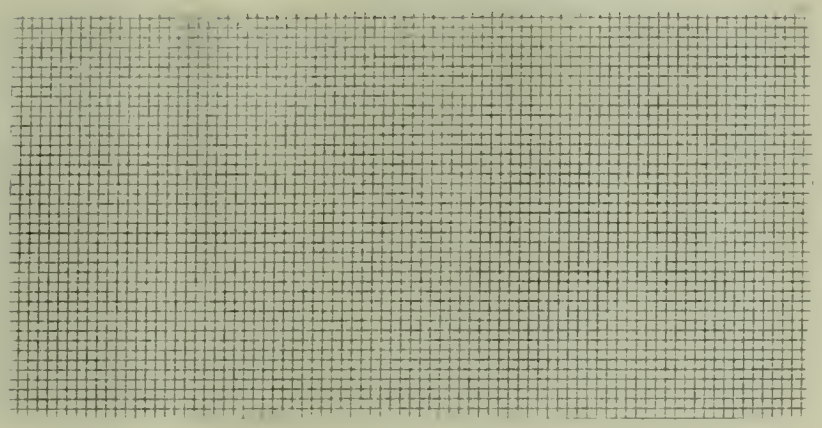

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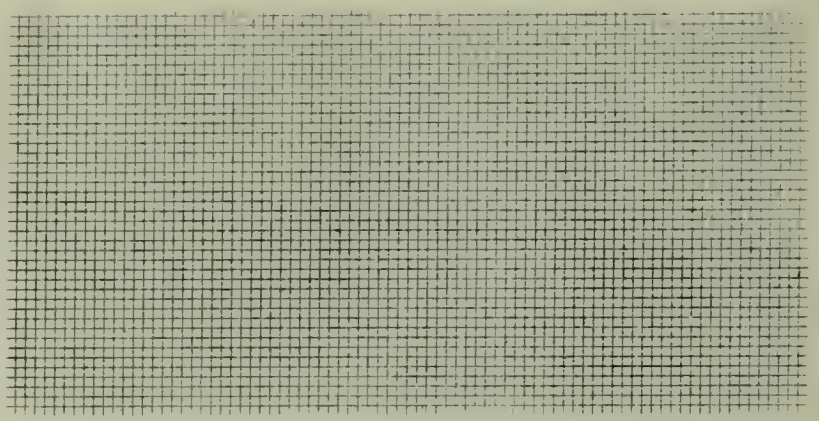

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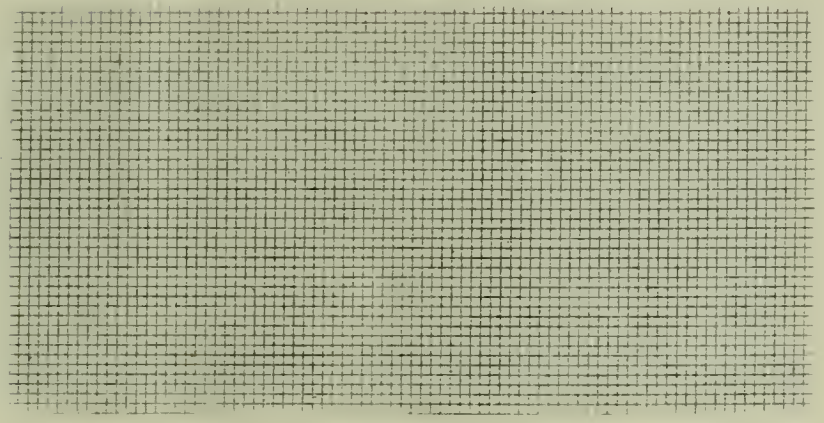

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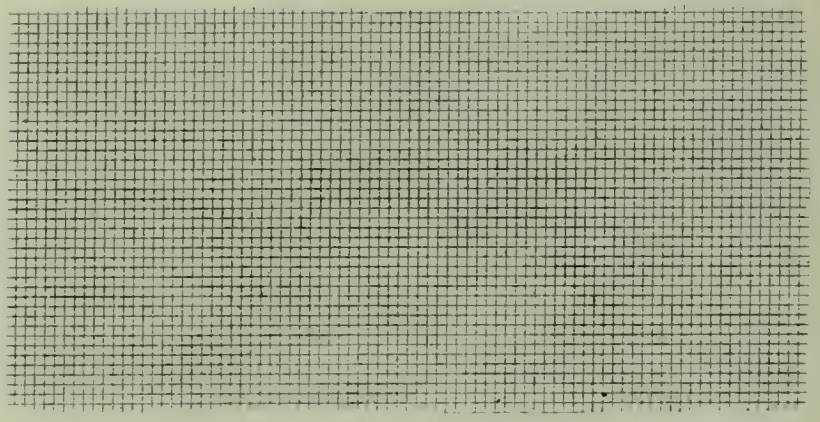

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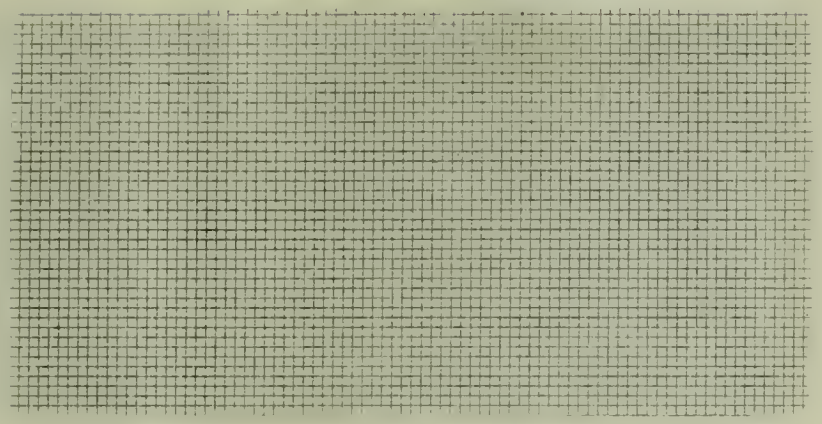
BLACK, WEFT. WHITE, WARP.



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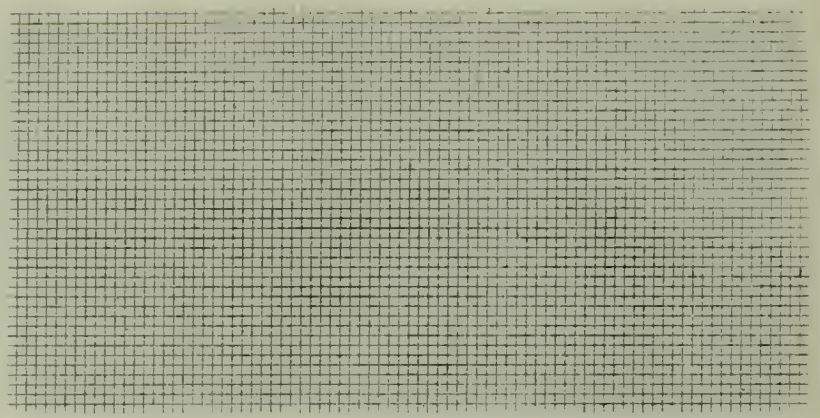

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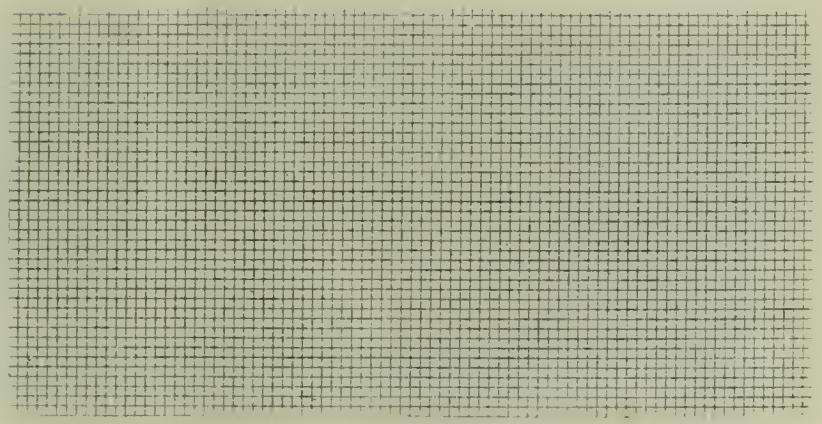

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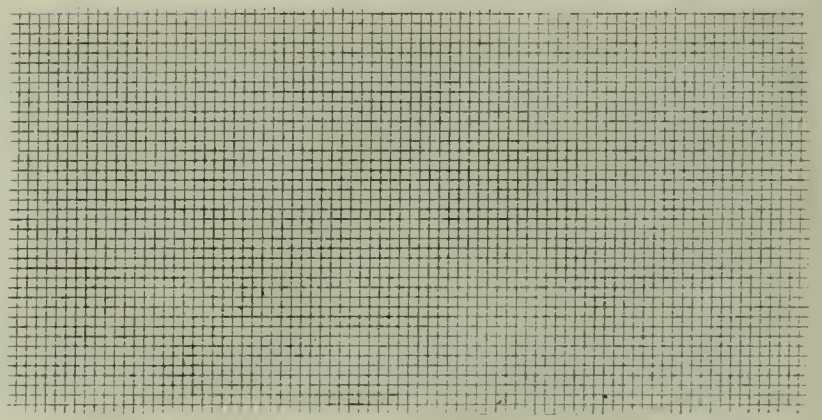

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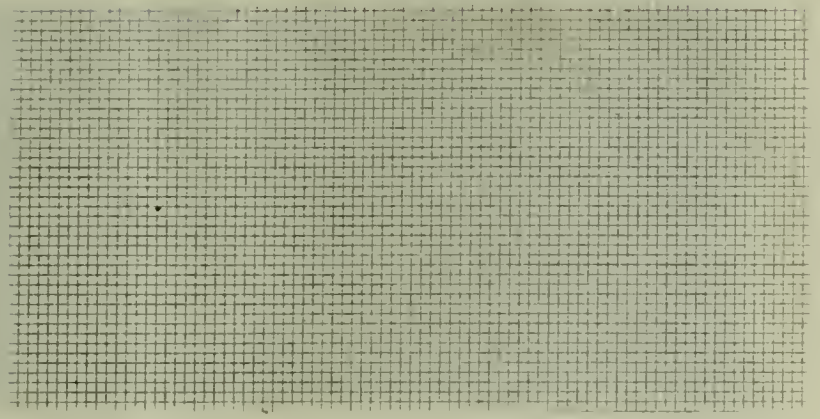

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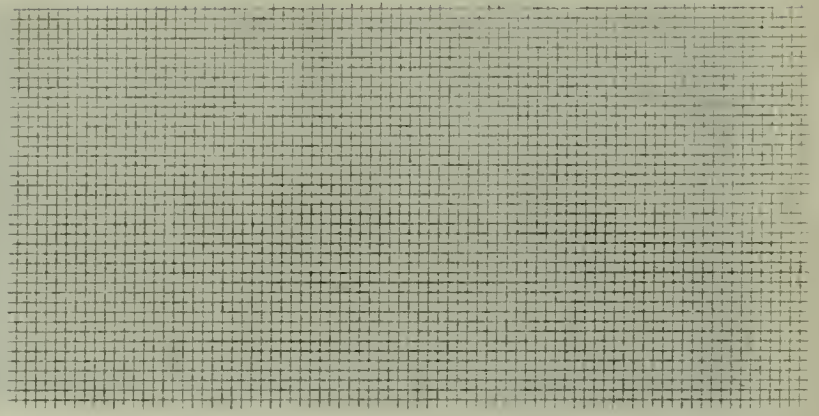

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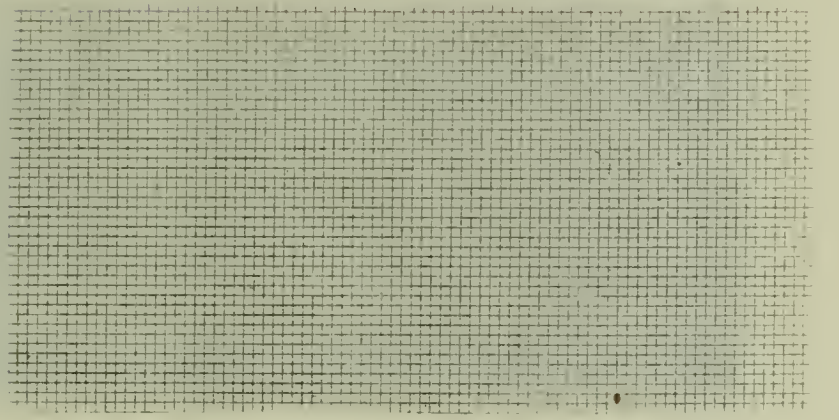

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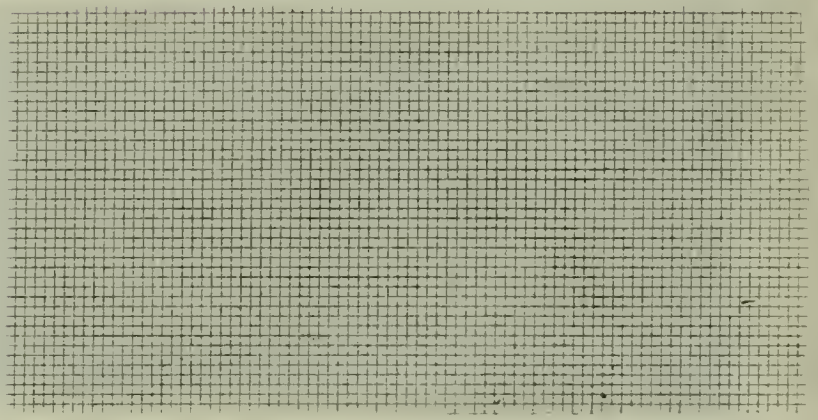

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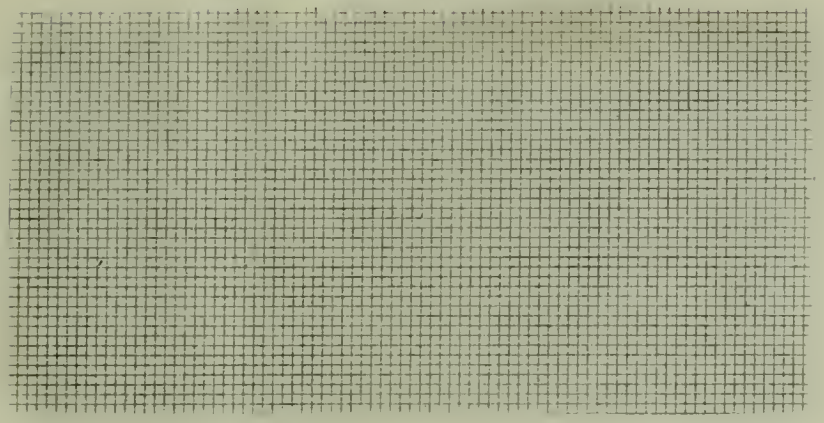

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SHAFTS PICKS TO THE ROUND.

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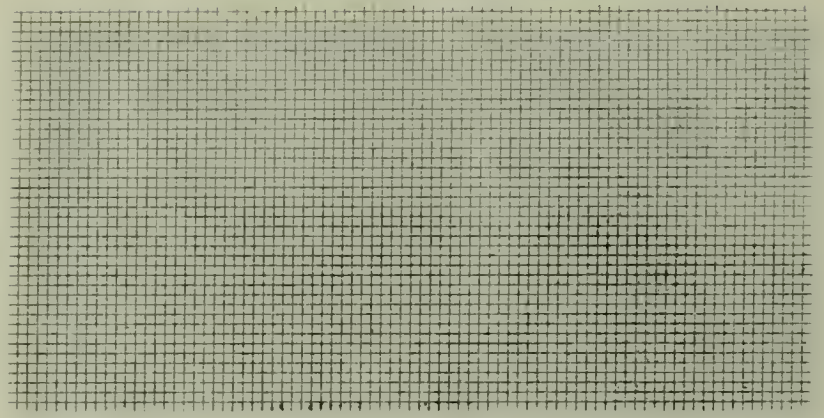

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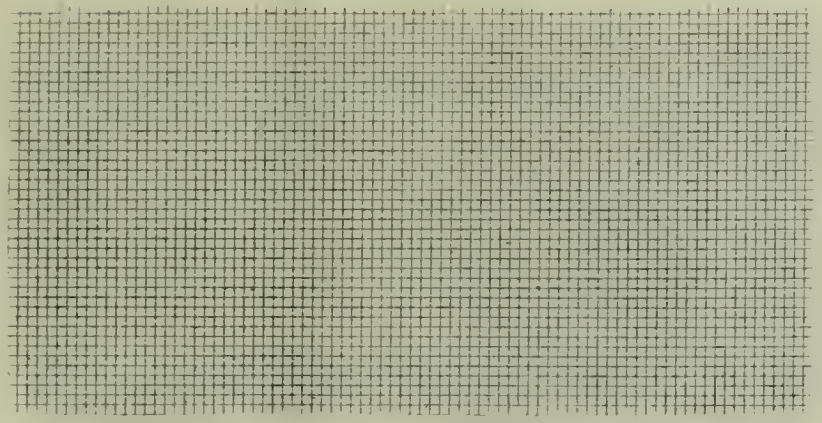
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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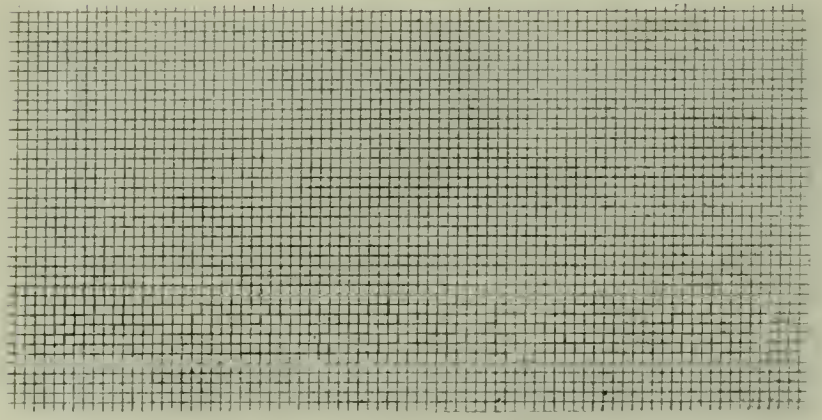
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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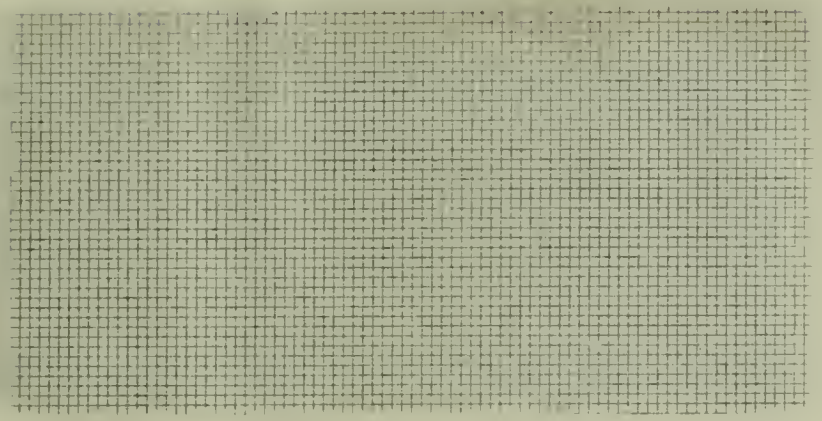
SHAFTS PICKS TO THE ROUND

BLACK, WEFT. WHITE, WARP.



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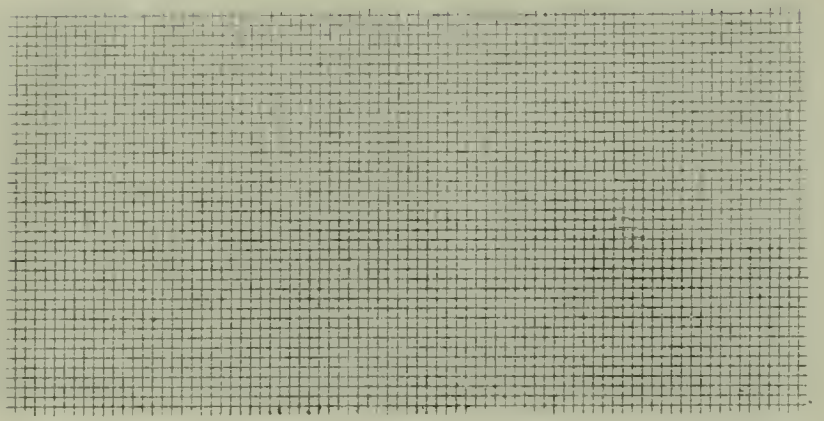
BLACK, WEFT. WHITE, WARP.



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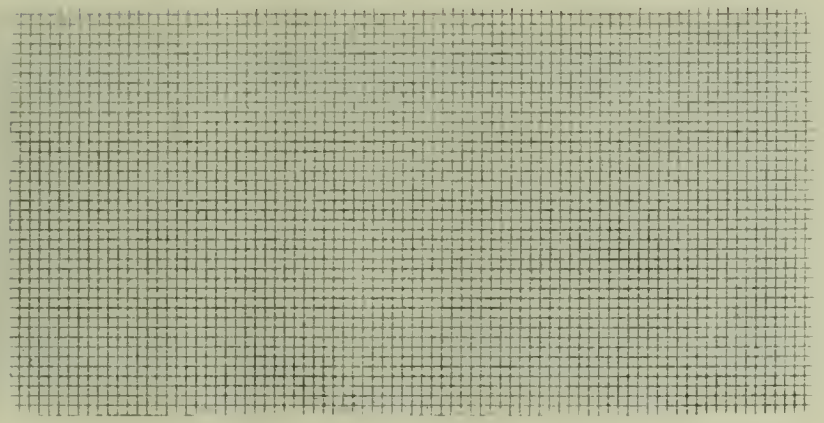

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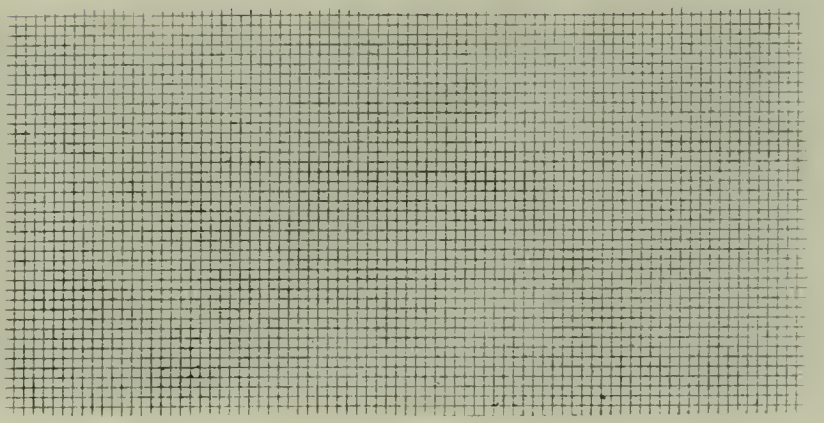

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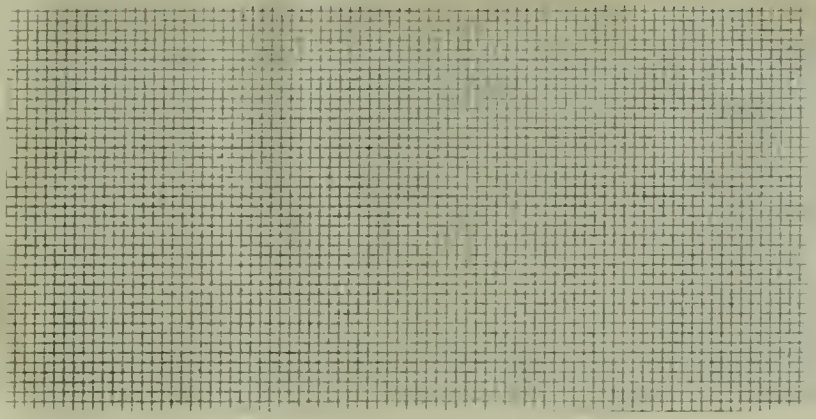

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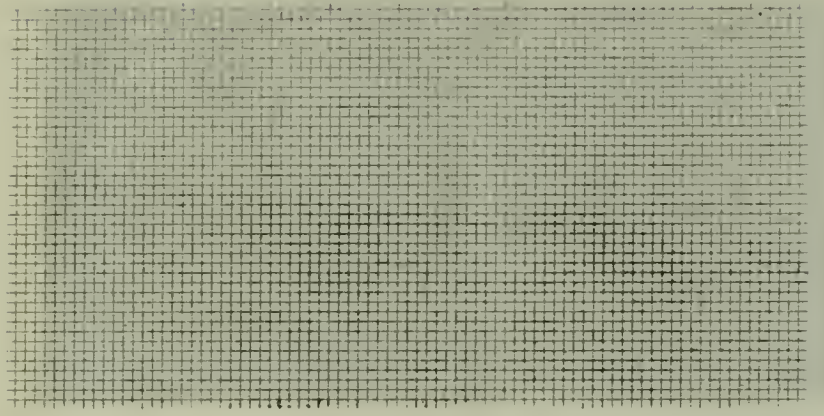

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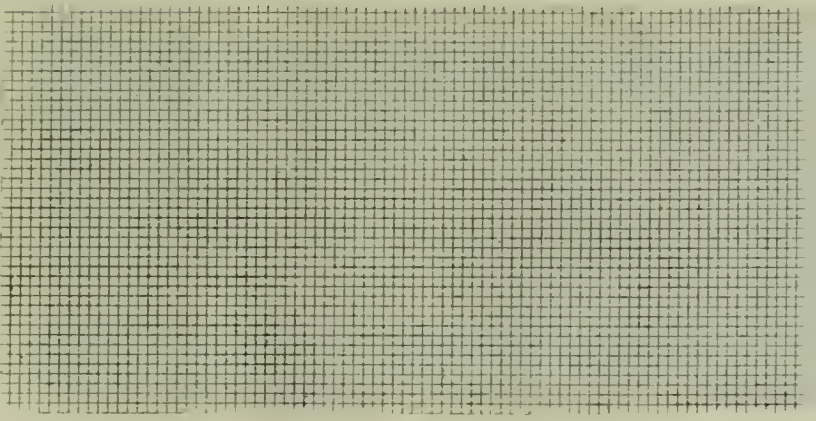

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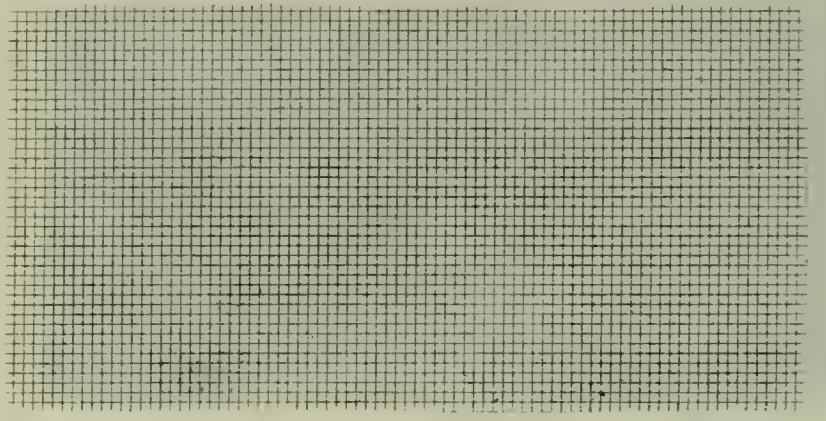
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN No.

SHAFTS PICKS TO THE ROUND

BLACK WEFT. WHITE, WARP.

DESIGN No.

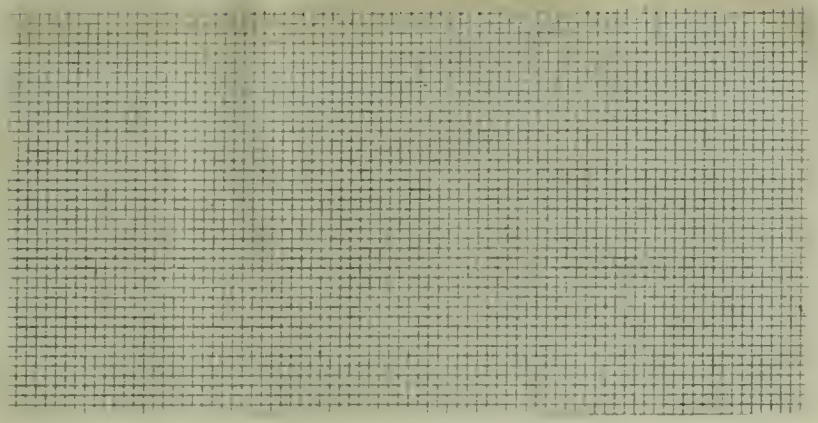
SHAFTS PICKS TO THE ROUND

BLACK WEFT. WHITE, WARP.

DESIGN Nº

SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



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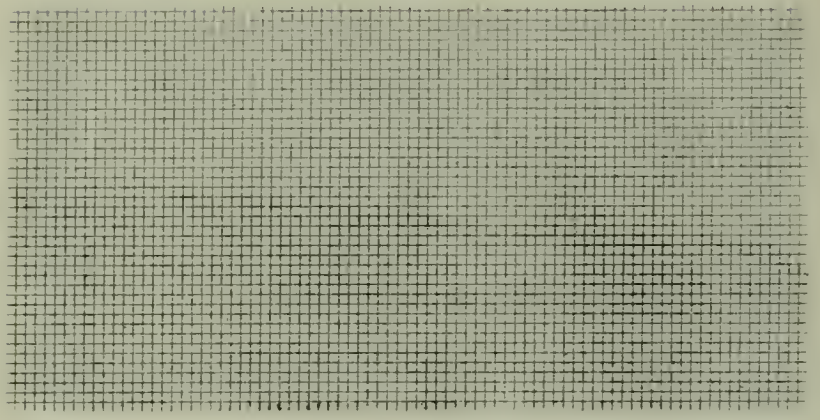
BLACK, WEFT. WHITE, WARP.



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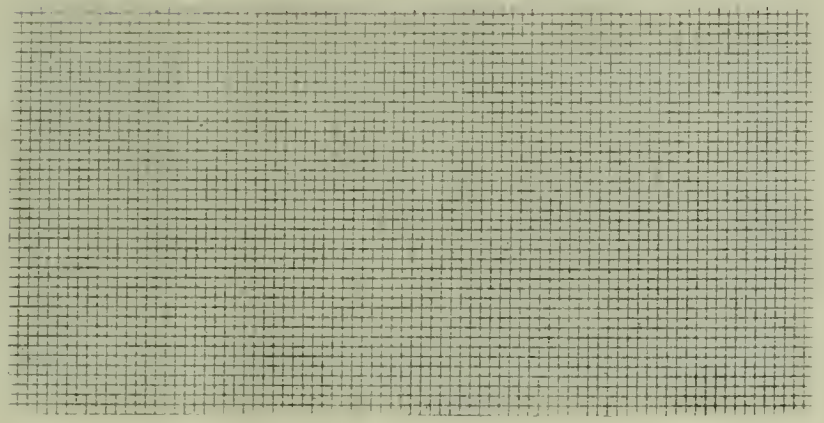

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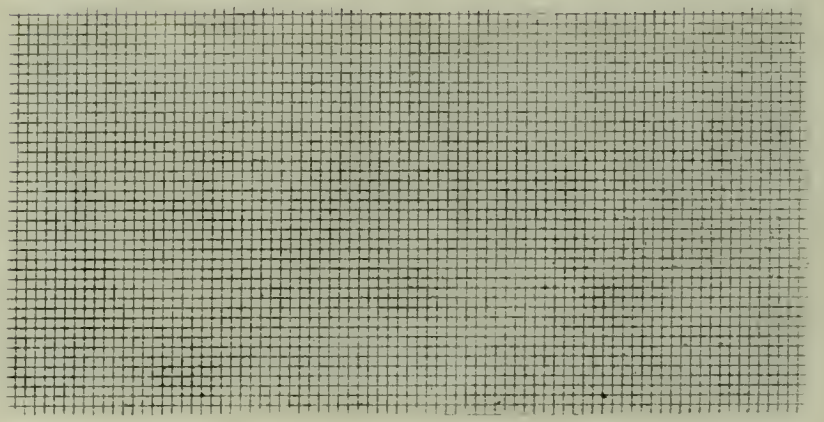
SHAFTS PICKS TO THE ROUND.

BLACK, WEFT. WHITE, WARP.



DESIGN Nº

SHAFTS PICKS TO THE ROUND

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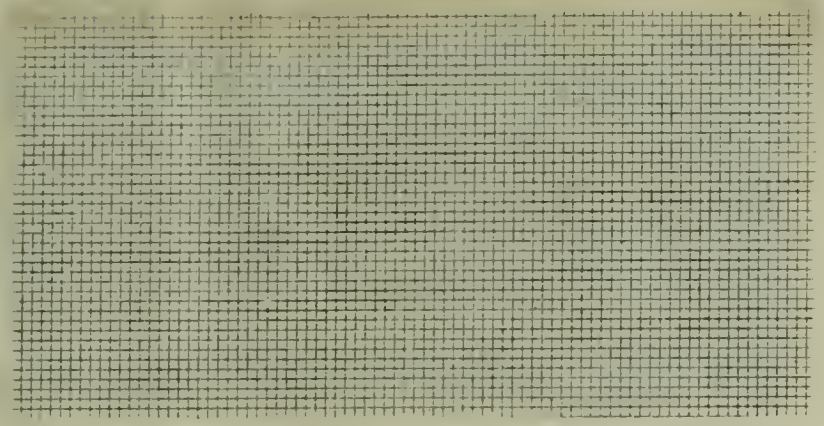

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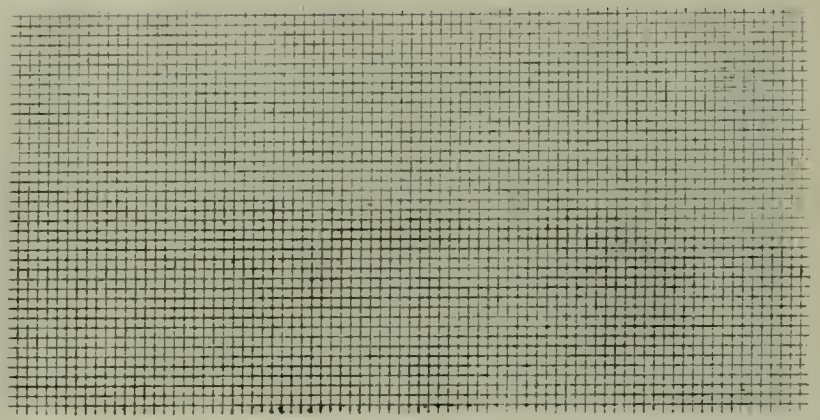

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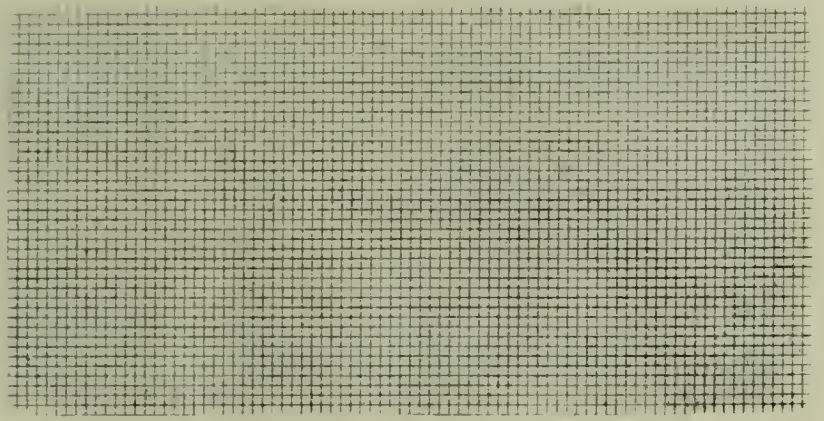

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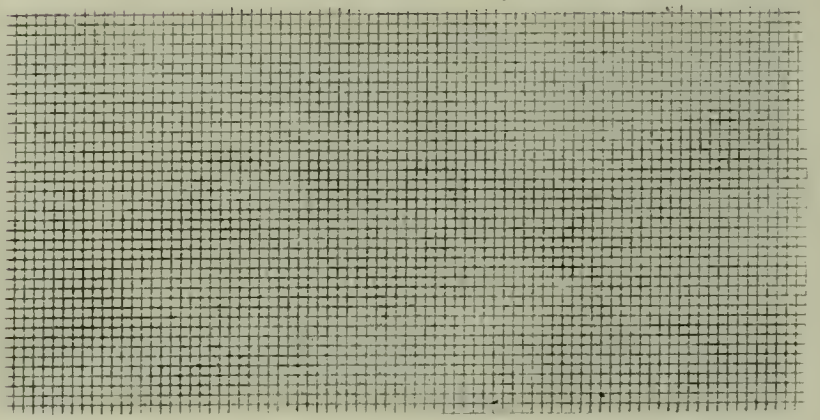

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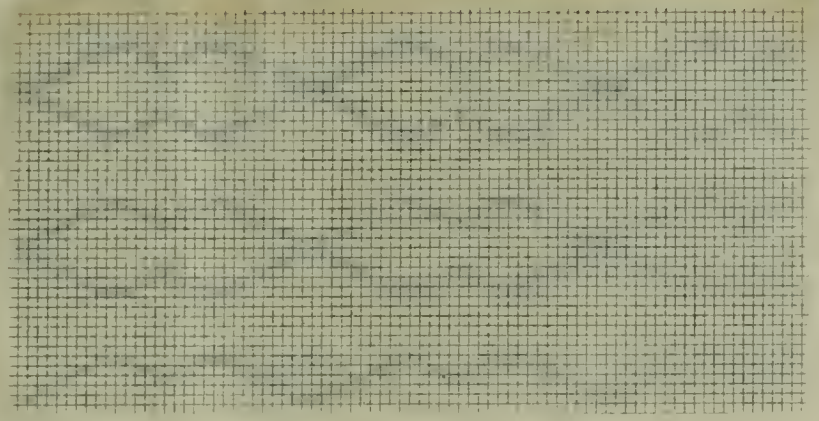

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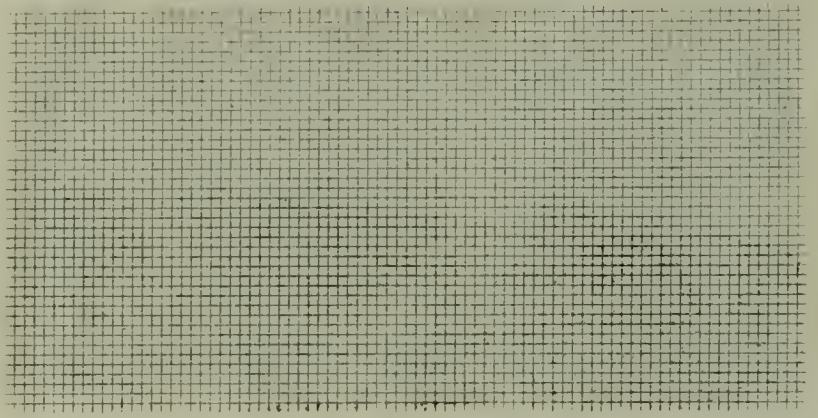

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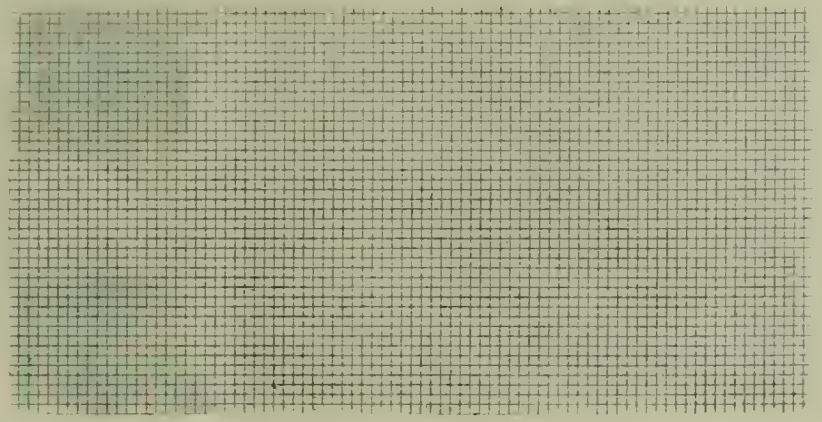

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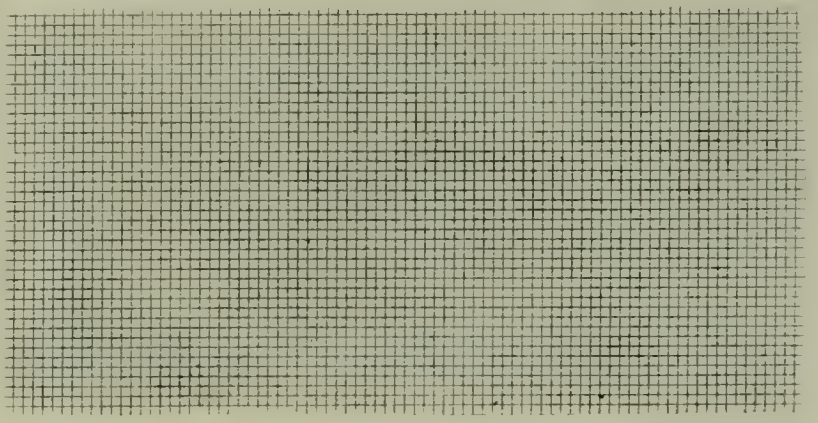

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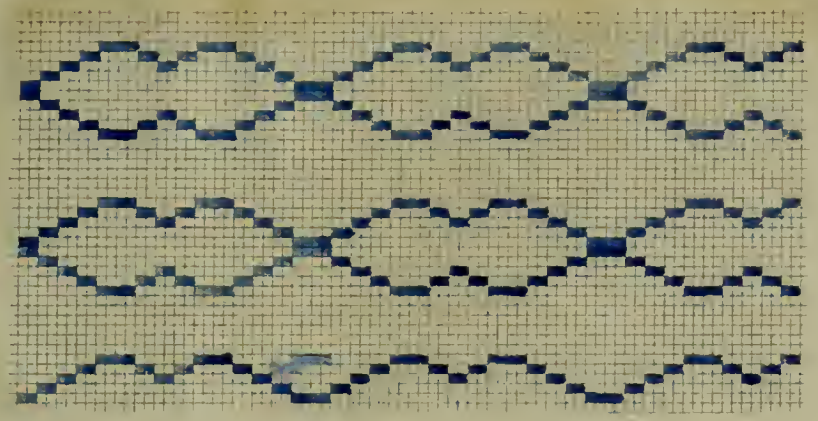

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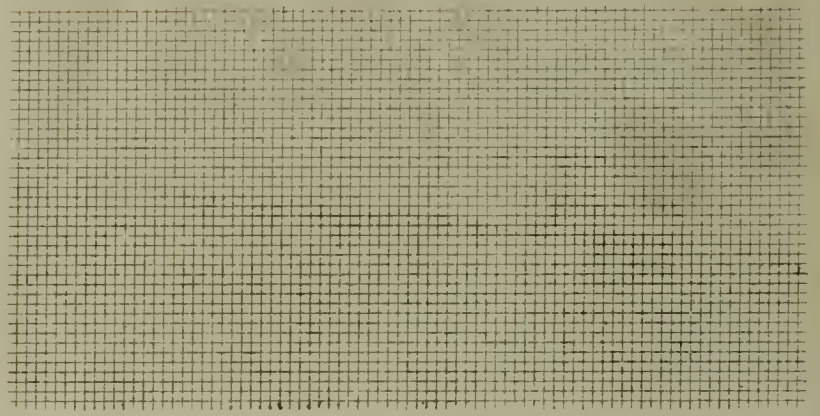

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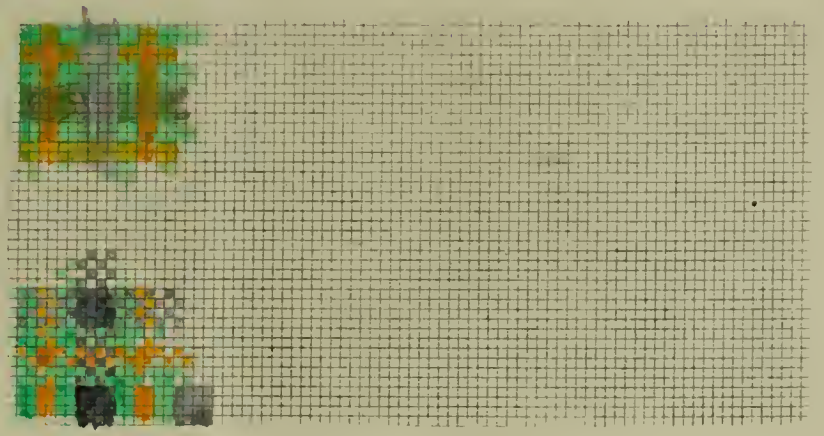

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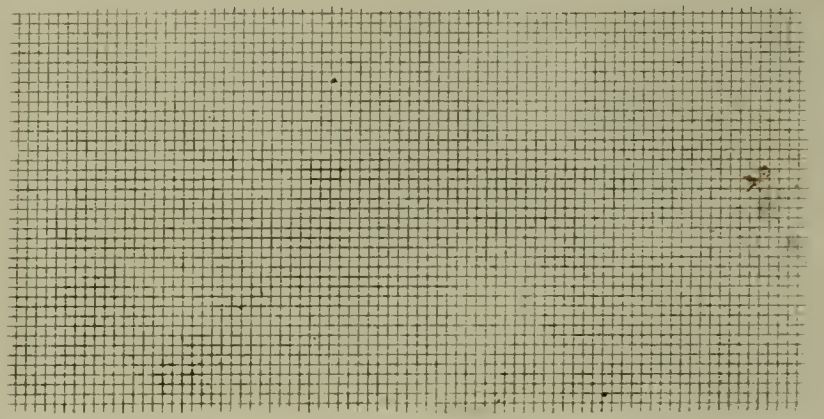
BLACK, WEFT. WHITE, WARP.